WESTERN GAS

16885

May
1932

20 Cents
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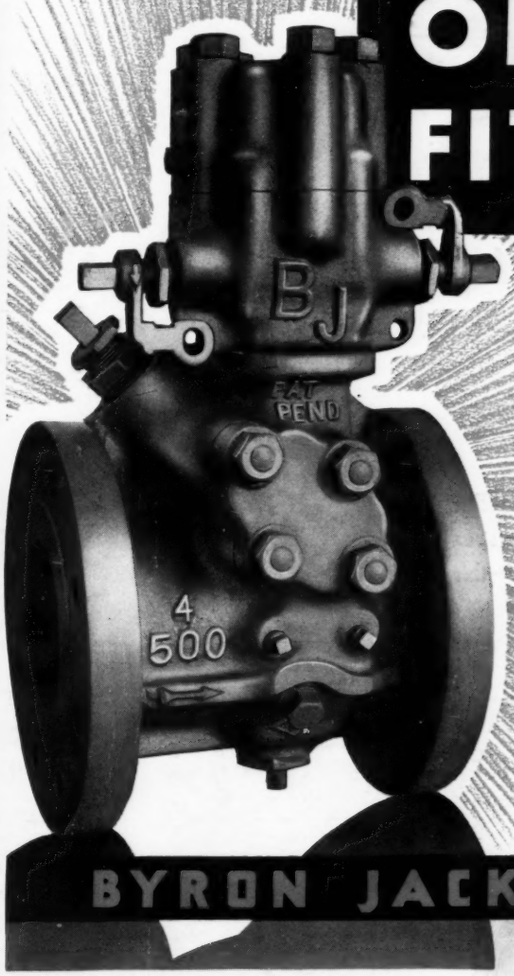
Gas Engineers
Approve the
TWO-PLATE
Feature

The BJ DUPLEX ORIFICE FITTING



VISITORS to the Tulsa Convention! ...See the model demonstrated at the Mayo Hotel.

•

Ask for literature explaining how *Accurate Metering* has been combined *with Easy Operation.*

BYRON JACKSON CO.

P. O. BOX 1307, ARCADE STATION
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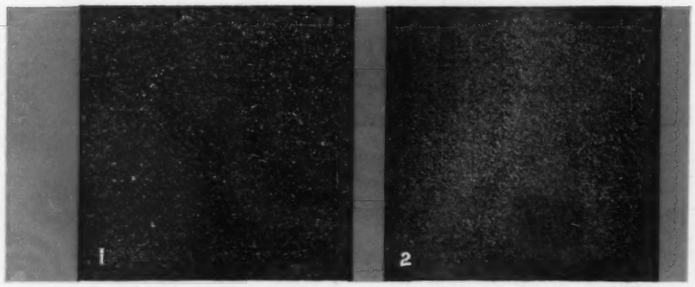
A MONTHLY JOURNAL DEVOTED TO THE
WESTERN GAS & APPLIANCE INDUSTRIES

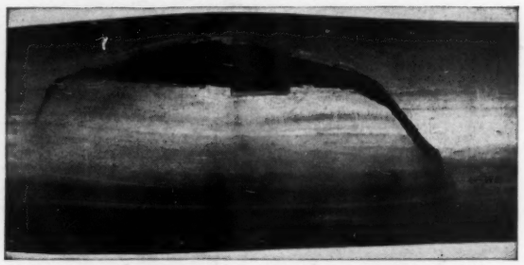
EVERY TEST PROVES

THE STRENGTH OF WELD

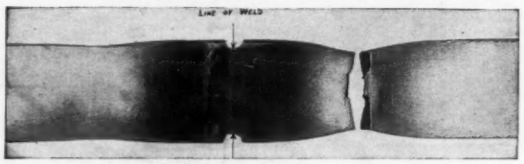


At left—No. 1—Typical structure of Republic Electric Weld Pipe Wall.

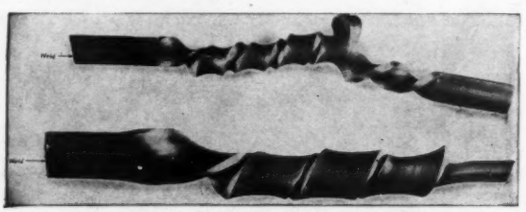
At left—No. 2—Same pipe as at left showing typical structure at weld.



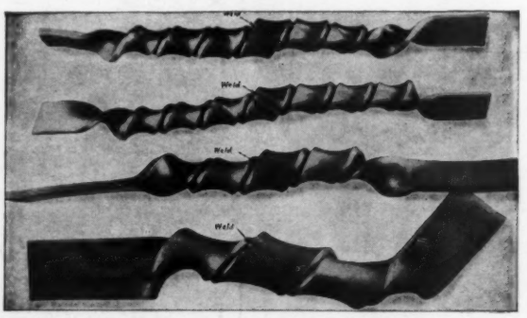
Pittsburgh Testing Laboratory test. Bursting Pressure 4,200 lbs. per sq. in. Rupture occured away from weld.



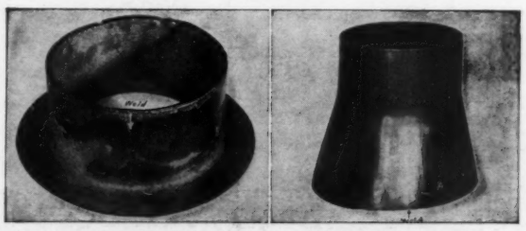
Tensile test with ¼-inch diameter notch at weld.



Ductility (twist) tests on electric weld pipe with weld longitudinal through center.



Ductility (twist) tests on electric weld pipe with weld at right angles to axis of test strip.



Showing vanstoning quality of electric weld pipe.

Ductility (expansion) test on electric weld pipe.

IT IS AND IT ISN'T A WELDED PIPE

Republic Electric Weld Line Pipe, Casing and Tubing actually is welded pipe, made by electric welding under the original Johnson Patents. But from the standpoint of performance the weld is non-existant, and it is by performance that it should be judged.

If you are inclined to question—remember these facts. Under the miscroscope the structure at the weld is practically the same as at any other point in the pipe wall. Tensile tests show more fractures away from the weld than at the weld. Twist tests with the weld longitudinal or at right angles to the test strip show no weakness. Expansion and vanstoning show no fractures at the weld. Hydrostatic tests to failure show that the weld has no relation to the position of rupture. And of more than 5000 miles in use, not a single length has failed in service.

So forget that there is such a thing as a weld in Republic Electric Weld Pipe. Actually it is there, but for all calculations, the strength of the weld may be considered as the strength of the wall,—this by no less an authority than the U.S. Bureau of Standards.

Send for a copy of Catalog 210-B.

REPUBLIC STEEL CORPORATION

GENERAL OFFICES YOUNGSTOWN, OHIO

REPUBLIC

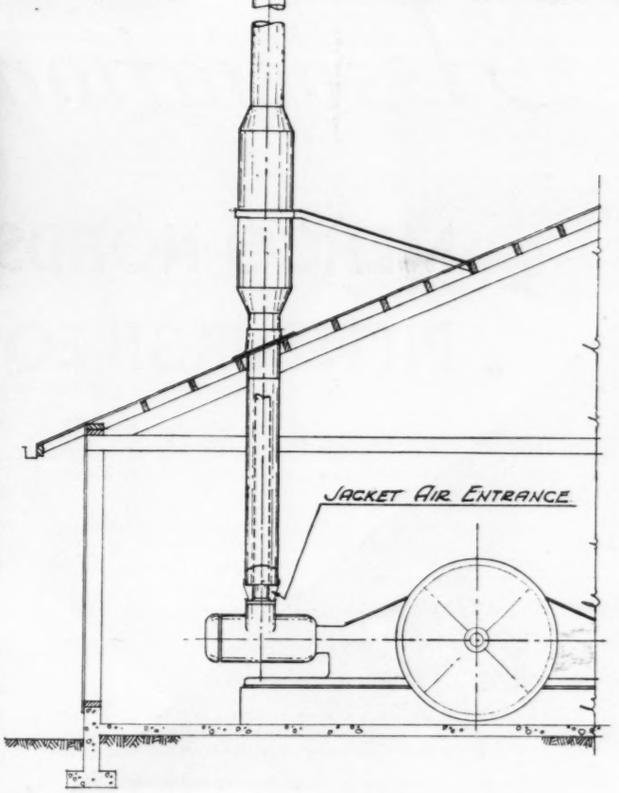
ELECTRIC WELD LINE PIPE

CASING

TUBING

New Muffler Efficiency

Perfected by FLUOR



Gas engine manufacturers announce a new construction feature—exhaust connections on top of cylinders. FLUOR engineers anticipated the result of this modern improvement. Consequently they now present the new overhead, air-cooled muffler.

This advanced muffler utilizes the same principle as other Fluor mufflers but installation is easier. Requiring no additional ground space, it simplifies plant layout.

Air is pulled into this muffler's jacket from around the exhaust connection on the cylinder, thus assuring positive removal of heat from this point. For cold climates, arrangement is such that air supply may be secured through closed duct from outside; this elimates loss of heated air.

In addition to these points, all the previous advantages of other FLUOR mufflers are retained; these are listed here: 1. No water required. 2. No scaling or breaking of pipe. 3. Cooler stack temperatures; Stack paint lasts longer. 4. No spray to corrode adjacent buildings. 5. Expansion coupling eliminated. 6. Consistently low back pressure. 7. Greater engine efficiency. 8. Engine foundations remain cooler. 9. Better engine room ventilation. 10. Quiet operation.

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OVERHEAD, AIR-COOLED MUFFLERS

May, 1932, Volume VIII, Number 5, Western Gas is published by Western Business Papers, Inc., at 124 West Fourth Street, Los Angeles, California. Subscription price (in advance) 20 cents the copy; $2.00 per year; 2 years, $3.00; $3.00 per year foreign. Entered as second class matter June 1, 1925, at the postoffice at Los Angeles, under the Act of March 3, 1879.

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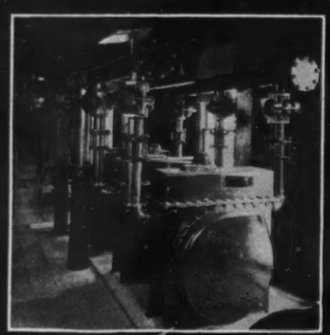
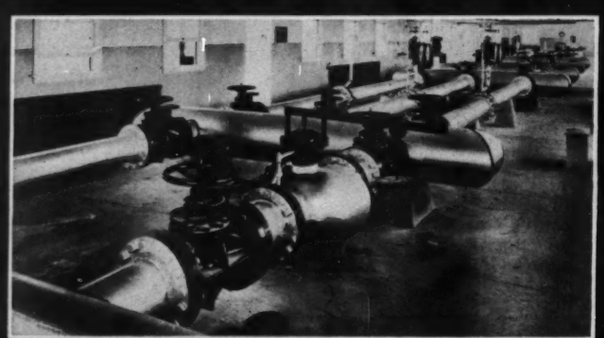
PITTSBURGH EQUITABLE METER CO.



EMCO-MERCO IN IOWA



EMCO-MERCO IN UTAH

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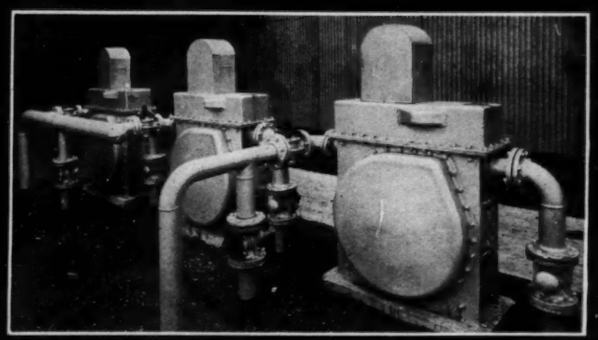
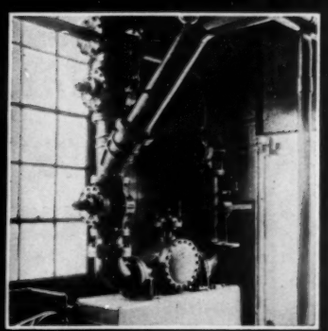
EMCO-MERCO IN LOUISIANA



EMCO-MERCO IN NEW YORK



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ACIPCO ANNOUNCES

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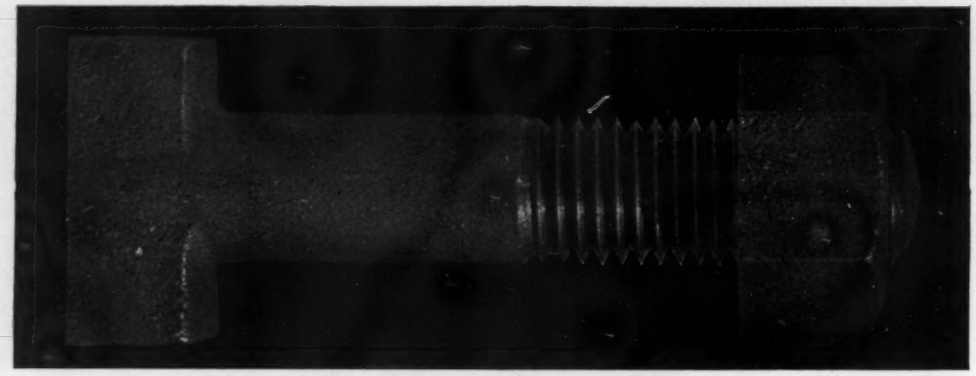
"ZEE-METAL" BOLTS



a new but thoroughly tested development which enables us to offer

100% Cast Iron Joints in our "Simplex" Products

. . . minimum ultimate tensile strength, 75,000 lbs. per sq. in.

. . . minimum "yield point," 55,000 lbs. per sq. in.

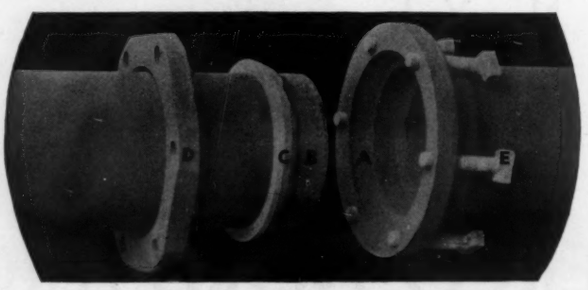
. . . no "stretch" or tendency to strip threads

. . . perfect threads; specified "finger tight"

. . . true cast iron's *barehanded resistance* to corrosion

Cast Iron ZEE-METAL BOLTS are ideal for use with cast iron pipe. They have been adopted as standard and unless specified otherwise will be furnished with our "Simplex" products, including:

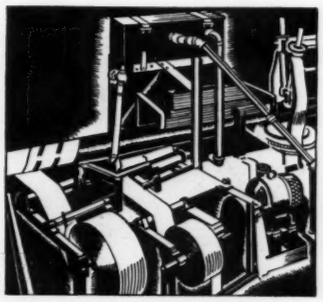
- MONO-CAST DOUBLEX SIMPLEX PIPE
- MONOLOY DOUBLEX SIMPLEX PIPE
- SIMPLEX PREPARED JOINT PIPE



(A) *Socket End of Pipe,* (B) *Spigot End of Pipe,* (C) *Endless Ring Gasket,* (D) *Cast Iron Gland,* (E) *Cast Iron "Zee-Metal" Bolts*

AMERICAN
CAST IRON PIPE COMPANY
BIRMINGHAM, ALABAMA

SAN FRANCISCO DALLAS NEW YORK CITY CHICAGO MINNEAPOLIS SEATTLE KANSAS CITY LOS ANGELES CLEVELAND



You can't expect men to be perfect

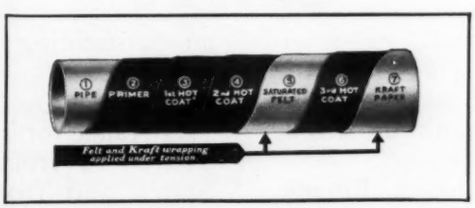
But machines have to be!

No matter how experienced men may be, they make mistakes, and the slightest mistake in wrapping and coating pipe will prove dangerous and expensive. General Paint Corporation's Hill-Hubbell Process of mill-wrapped pipe eliminates all danger of mistakes. . . . The wrapping is applied at the pipe mill under ideal conditions. The pipe is clean — free from dirt and grease and moisture. There is no waste or expensive time lost in cleaning pipe, as is the case with field application, because, with the Hill-Hubbell Process, the pipe is already clean and new.

For many years there was a demand for some method which would coat and wrap pipe, but would eliminate the imperfections of field application. General Paint Corporation's Hill-Hubbell Process of mill-coating and wrapping pipe was successfully developed in 1928. Since then the largest gas and oil companies in the United States have bought over 15,000 carloads of line pipe mill-coated and wrapped by the Hill-Hubbell Process.

The number of repeat orders received from these great companies clearly demonstrates how successfully our pipe protection has stood up under the most severe conditions. In 1928 one customer gave us two repeat orders. During 1931 many of the large gas and oil companies gave us from 10 to 21 separate orders; one of the largest utility companies gave 23 orders!

For complete information write to any of the offices of the General Paint Corporation.



Plants for coating and wrapping by the Hill-Hubbell Process are located in the following cities for the production of the pipe manufacturers listed:

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YOUNGSTOWN SHEET & TUBE CO.
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A Complete Reference Work on

BUTANE PROPANE GASES

THIS Handbook comes in response to a very definite need. A tremendous amount of development work has been accomplished for the liquefied petroleum gas industry in a brief space of time, with many companies participating. And to date there has been no one source to which the industry could go for information on all phases of the field. This is the mission of the *Handbook of Butane-Propane Gases*—consolidating and organizing all of these reference data under one cover.

Through the regular publication of "Butane-Propane News," a monthly feature of WESTERN GAS, the editors have established close contact with all branches of the liquefied gas industry—production, bottled gas and town plant distribution, gas enrichment—and to assure a high standard of technical excellence for the Handbook leading figures in the industry have extended their cooperation as contributors.

On the opposite page contents of the *Handbook of Butane-Propane Gases* are reviewed. No phase of the field is neglected, and every major subject heading is treated in detail, making the Handbook an outstanding reference work. Numerous tables, charts and illustrations add to its value.

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(b) Present and Potential Scope of the Industry: Statistics on marketed production; available supply; number of central plants, bottled gas distributors, producers; number of gas companies enriching; future field of expansion for bottled gas and central plant service, as well as other forms of liquid gas utilization.

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Vapor pressure curves and tables; tables of constants for hydro-carbon series; proportioning curves, etc. A section made up of basic reference data, with liberal use of curves and charts.

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Sources for liquefied petroleum gases; the natural gasoline extraction process; refinery gases; dehydration; mixes for gas enrichment, industrial plants, bottled gas, and town plant use under various temperature conditions.

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Appliance design and adjustment for operation on liquefied petroleum gases; combustion characteristics; fuel consumption of various types of appliances; appliance efficiencies on butane-propane, compared to other types of gas.

USE IN GAS MANUFACTURE:

Calculations in connection with use of propane and butane with manufactured gases; enrichment of manufactured gas transmitted under high pressure; use of propane and butane to meet peak loads; use of propane and butane as a substitute for gas oil for the carburetion of blue water gas; use of butane or propane for heating gas underfired coke ovens to reduce coke production.

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Design of plant and distribution system for both air-butane and undiluted vapor types; measurement and other operating problems; town survey; sales organization; rates and billing.

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One-drum distribution; two-drum distribution; bulk stations; sales organization; rates and billing; utility co-operation on bottled gas sales; competitive fuels; combining central plant and bottled gas service; railway, marine and other special installations.

INDUSTRIAL USES:

Comparative costs of liquefied gases, coal, oil, manufactured and natural gas; description of plant lay-outs for industrial use of liquid gases; conversion problems in changing from other types of fuel to liquid gases; present and potential field for industrial use of these products; application of liquid gas to various industrial processes.

SPECIAL REFERENCE FEATURES:

(a) Directory of central plants, listing the towns served (with town population), date service began, type of service, type of distribution system.

(b) Directory of bottled gas distributors.

(c) Catalogue Section: Detailed specifications of equipment and appliances designed especially for this industry.

(d) Index: Cross-referenced by subjects and authors.

(e) Buyers' Guide: A commodity directory of appliances and equipment, with names and addresses of all manufacturers serving the industry.

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Long-lived, economical cast iron pipe with a joint that's gas-tight under medium and high pressures—a mechanical joint developed on "stuffing-box" lines. Installation simple and speedy. You merely slip on a gasket, tighten six bolts and your Anthony Joint is complete. Available with de Lavaud centrifugally cast pipe or pit cast pipe and fittings. All rings, bolts and gaskets interchangeable. Anthony Joint bends, tees and other fittings are also usable with plain end pipe.

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U. S. CAST IRON PIPE

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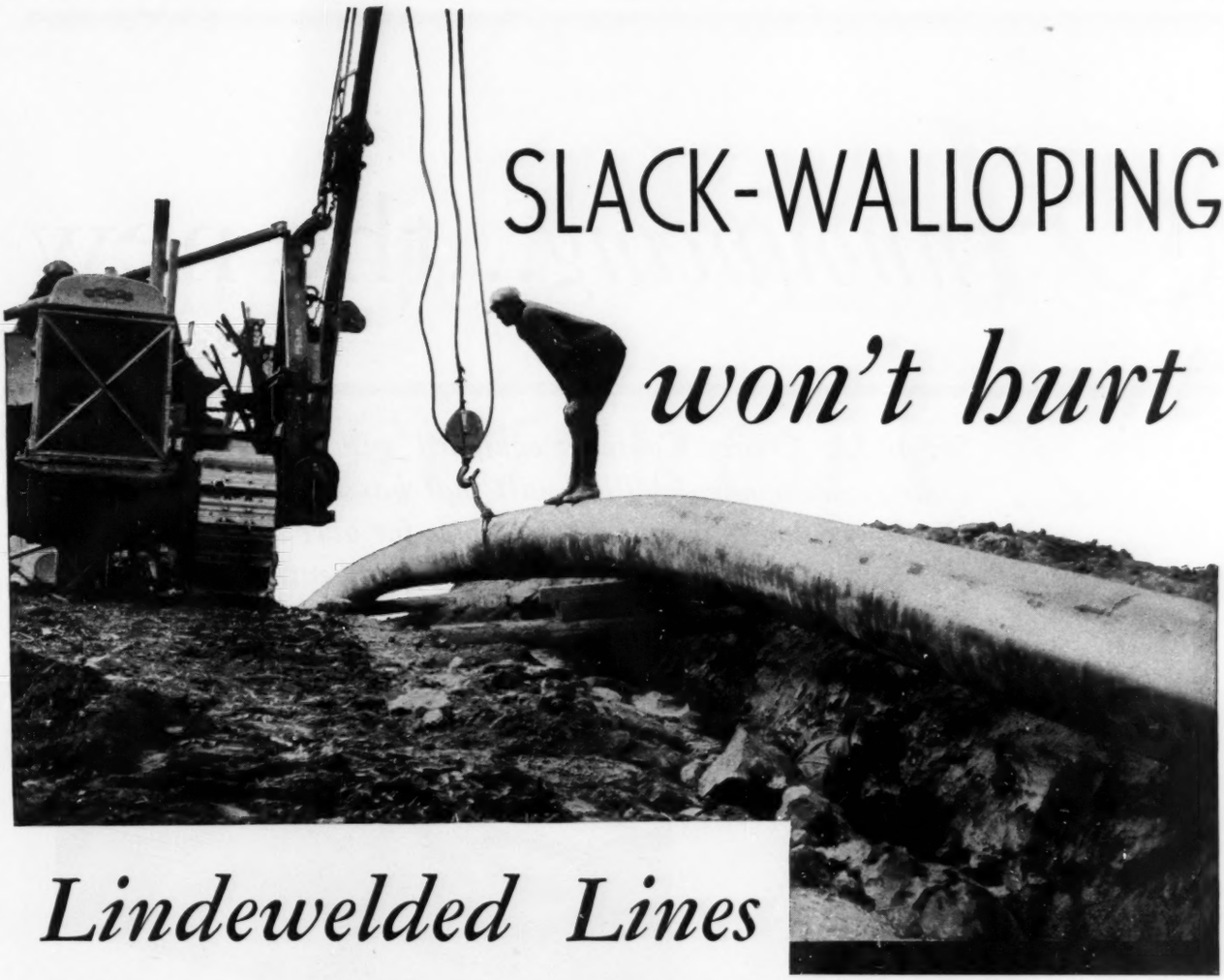

SLACK-WALLOPING *won't hurt*

Lindewelded Lines

A TEXAS pipe line company subjected a 2,000-ft. test section of 24-in. Lindewelded line to severe bending strains by "slack-walloping" it on skids over a 64-in. trench. The line was allowed to expand and contract with changing temperatures. Not a joint failed. Lindewelding insures strength.

It saves money, too.

Lindewelding takes 30 to 60 per cent less time than other methods and 30 to 40 per cent less welding material. It is not a new kind of welding; it is a new way to do oxy-acetylene welding. It can be done with ordinary blowpipes or with special apparatus which makes welding almost automatic and further increases its speed. Experienced welders quickly master Lindewelding technique; beginners learn it more readily than other methods.

Procedure controls for this cost-cutting method of oxy-acetelyne welding are available to all Linde customers as a part of Linde Process Service. Any Linde District Office will be glad to give you complete information.

Motion Picture Shows details of Lindewelding

Lindewelding technique differs from neutral-flame welding technique in that it employs a special rod, a special flame adjustment, and the "backhand" method of blowpipe manipulation. The actual steps in making a Lindewelded joint are shown in our motion picture, "The Lindeweld Process for Pipe Line Construction". This picture will be loaned free of charge to pipe line officials and welding or engineering societies. It is furnished in 16 mm. and 35 mm. safety film and can be obtained by writing to any Linde District Office.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

126 Producing Plants UCC 627 Warehouse Stocks

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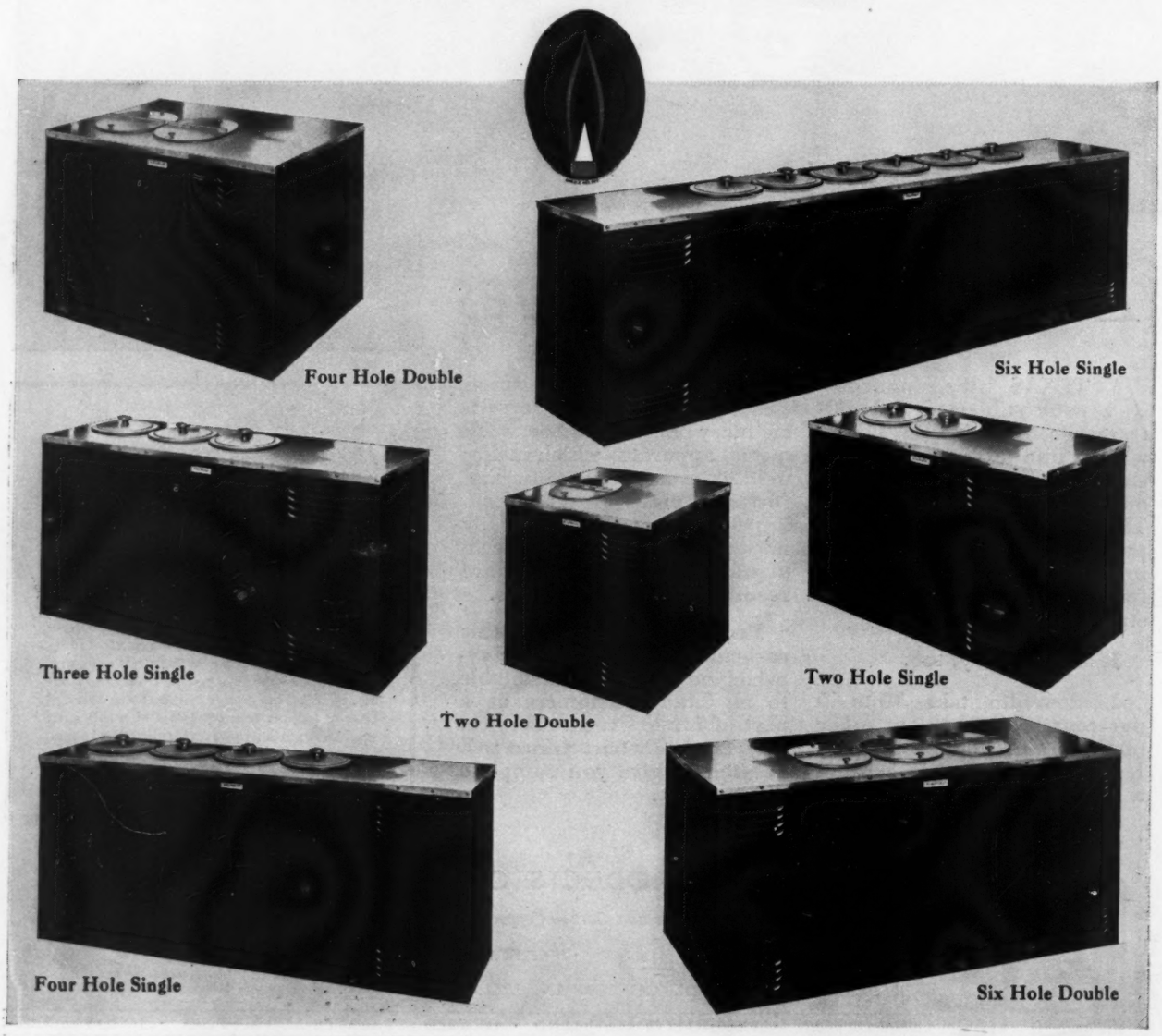
Announcing...the new

Seven Ice Cream Cabinets equipped with the same revolutionary chilling unit that has made Electrolux domestic models the choice for over a quarter of a million fine homes and apartments.



complete 1932 line of ELECTROLUX ICE CREAM CABINETS

NOW—a complete line of Electrolux Ice Cream Cabinets to add more MCFs to your load! And Electrolux Ice Cream Cabinets are the only ice cream cabinets on the market that operate WITHOUT MACHINERY.

Think what this means as a selling argument. In addition to doing everything manufacturers and retailers naturally expect of an ice cream cabinet, Electrolux puts an end to the bugaboo High Maintenance Cost. For, with no machinery, there's little about Electrolux Ice Cream Cabinets to get out of order . . . cause trouble . . . require servicing. As a result, the new Electrolux Ice Cream Cabinets are a sensational development in the ice cream industry!

You can increase your profits—boost your load—with Electrolux Ice Cream Cabinets just as you have done with Electrolux domestic models. Right now plan to incorporate this commercial line in your Electrolux sales effort for 1932. For complete details, just fill out coupon below. Electrolux Refrigerator Sales, Inc., Evansville, Ind.

ELECTROLUX
THE *Gas* REFRIGERATOR

ELECTROLUX REFRIGERATOR SALES, INC.
Evansville, Ind.

GENTLEMEN: Please send me your illustrated catalogue on Electrolux Ice Cream Cabinets.

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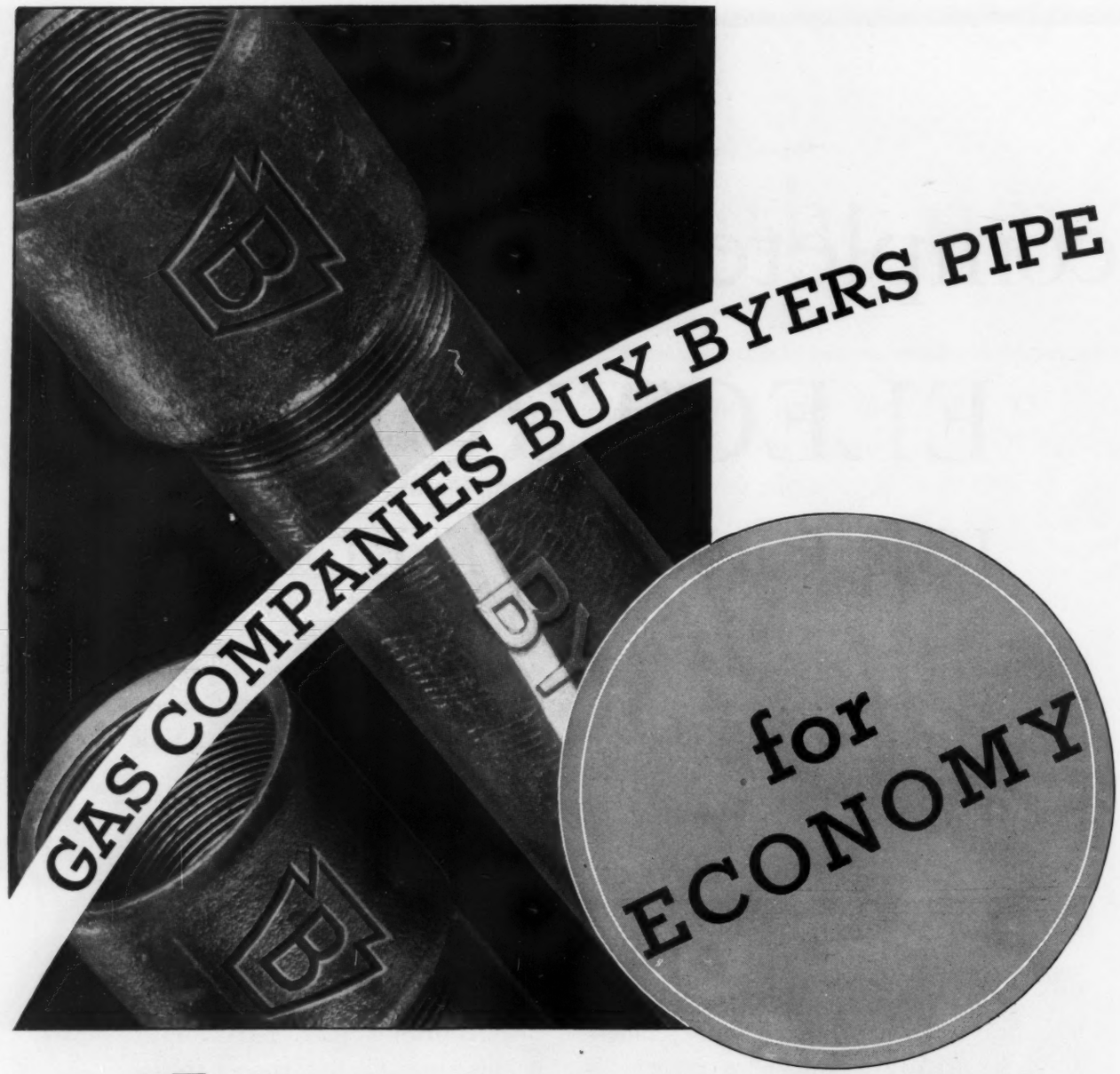

THREE important reasons are behind the trend set by gas companies to Byers Genuine Wrought Iron Pipe for economy. One is wrought iron's superior resistance to corrosion as proved by service records. Another is the fact that wrought iron makes up with a clean thread and a tight joint that is unaffected by frost upheavals or settling ground. A third is that wrought iron does not need the addition of expensive surface protection to justify its installation.

Evidence of the trend to Byers is shown by the fact that two large gas companies recently placed orders for substantial amounts of Byers Genuine Wrought Iron Pipe.

They based their decisions to use Byers on factual data of wrought iron's economy, which Byers representatives were able to furnish and which was verified by their own experience.

Let a Byers pipe expert confer with you. His knowledge of gas service problems is backed by 68 years of Byers engineering experience. Let him show you actual service records proving how Byers Genuine Wrought Iron is a true economy. A. M. Byers Company, Pittsburgh, Pa. Established, 1864.

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PIPE • CASING • COUPLINGS • NIPPLES • WELDING ELBOWS • SPECIAL BENDING PIPE
BAR IRON • TUBING • PLATES • SHEETS • BILLETS

STANDARD of QUALITY for 68 YEARS — BYERS 1864 GENUINE WROUGHT IRON — TODAY BETTER THAN EVER

FLEXIBILITY

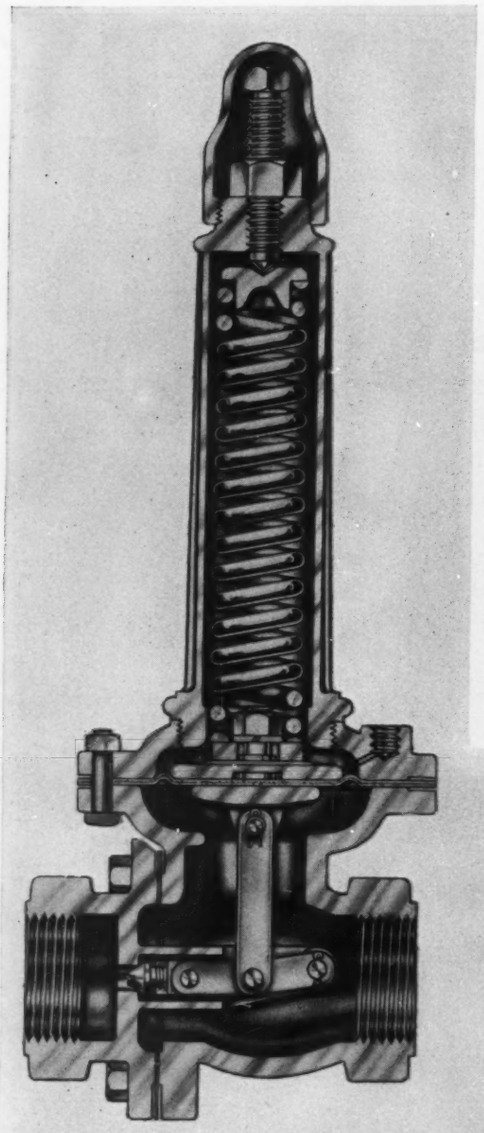
Made in all standard sizes. Special sizes made to any specification.

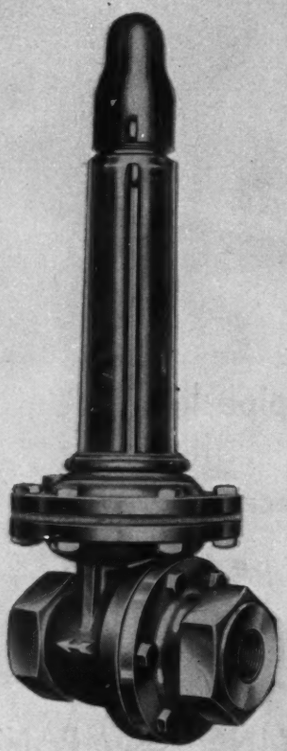
Regardless of the pipe line service . . . gas, oil or water . . . flexibility is of paramount importance.

DAYTON COUPLINGS permit this flexibility and maintain a permanently tight joint.

THE DAYTON PIPE COUPLING COMPANY
DAYTON, OHIO

DAYTON · ALL-STEEL COUPLINGS





Above: Cross sectional view of the new Reynolds half-ton regulator shows the rugged construction of this unit. At the right is the outside view of same regulator showing the bronze inlet casting coupled to main casting.

REYNOLDS

NEW 1/2 Ton REGULATOR

● A Regulator thoroughly tested and tried in actual service for more than a year, is now offered the trade. Designed with ample factors of safety, this new Regulator will handle pressures up to 1000 pounds reducing same to pounds.

The feature of this Regulator is the bronze casting on the inlet side, which insures that there is no high pressure or inlet gas against the cast iron body. The inlet connection complete with pipe connection and fixed fulcrum is a one-piece bronze casting. This arrangement eliminates outside connection, and the possibility of leaks where the toggle pin goes through. With the toggle a part of the bronze casting, pressure on the toggle will not push it away from the cast iron body to which it is bolted.

If you have a High Pressure Control problem, let the Reynolds Engineers help you solve it.

●

REYNOLDS PRODUCTS FOR ALL KINDS OF PRESSURE REDUCTIONS—FOR EITHER ARTIFICIAL OR NATURAL GAS

GOVERNORS—Intermediate Pressure, Triple Outlet, Holder, Toggle Type Street. **REGULATORS**—High Pressure Service, Low Pressure Service, Intermediate Pressure, High Pressure Line, Single and Double District Station. **VALVES**—Automatic Quick Closing Anti-Vacuum, Relief, Cut-Off. **SEALS**—Mercury and Dead Weight. **MODEL 30** manufactured for vertical or horizontal installation.

● **REYNOLDS BRANCH OFFICES:**
422 Dwight Bldg., Kansas City, Mo.
2nd Unit, Santa Fe Bldg., Dallas, Tex.

● **REPRESENTATIVES:**
Eastern Appliance Co., Boston, Mass.
F. E. Newberry, Avon, N. J.

REYNOLDS GAS REGULATOR COMPANY
ANDERSON, INDIANA, U.S.A.
RECOGNIZED GAS CONTROL SINCE 1892

Installing cast iron pipe with
MECHANICAL JOINTS
for a high pressure gas line

ANOTHER of the rapidly mounting number of installations of cast iron pipe with *mechanical joints* for high-pressure gas service. Photograph shows lowering and entering of pipe preliminary to adjusting and bolting the mechanical joint.

Specifications called for approximately 15,000 feet of 10-inch cast iron pipe with mechanical joints, for ultimate pressure of 75 pounds.

The joints used are based on the "stuffing-box" principle employing rubber gaskets with follower rings. This principle is embodied in several designs of mechanical joints made by members of The Cast Iron Pipe Research Association. In field tests, and in actual service under medium and high pressures, it has been conclusively demonstrated that these joints are *gas-tight.*

For further information write to The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 309 Peoples Gas Building, Chicago, Ill.

Cast iron pipe bearing the "Q-check" trademark is obtainable from the following leading pipe founders: Alabama Pipe Company, Anniston, Ala.; American Cast Iron Pipe Company, Birmingham, Ala.; James B. Clow & Sons, 219 N. Talman Avenue, Chicago, Ill.; Donaldson Iron Company, Emaus, Pa.; Glamorgan Pipe and Foundry Company, Lynchburg, Va.; Lynchburg Foundry Company, Lynchburg, Va.; National Cast Iron Pipe Company, Birmingham, Ala.; United States Pipe and Foundry Company, Burlington, N. J.; Warren Foundry and Pipe Corp., 11 Broadway, New York.

CAST Q IRON

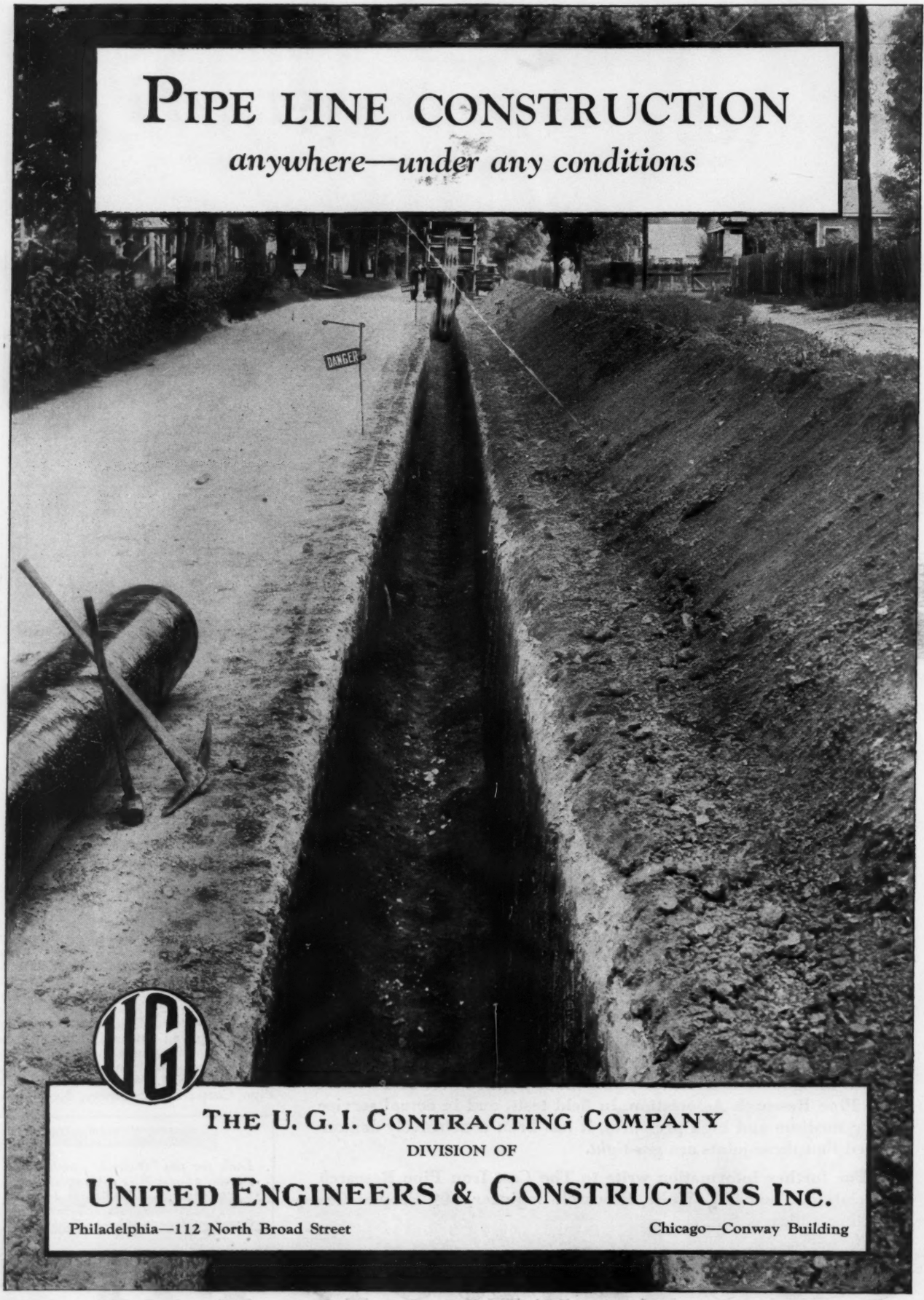
Look for the "Q-check" symbol as shown above. It is the registered trademark of The Cast Iron Pipe Research Association.

© 1932 The Cast Iron Pipe Research Association

CAST IRON PIPE

PIPE LINE CONSTRUCTION

anywhere—under any conditions



UGI

THE U. G. I. CONTRACTING COMPANY

DIVISION OF

UNITED ENGINEERS & CONSTRUCTORS INC.

Philadelphia—112 North Broad Street

Chicago—Conway Building

THESE PAGES PRESENT SOME OF THE OUTSTANDING EQUIPMENT WHICH WE OFFER TO THE INDUSTRY . . .

INTENSIVE SERVICE

PACIFIC METER WORKS is staffed by men who have grown up with the industry. To your measurement and control problems they bring practical experience and a personal interest. A consultation will not obligate you.

MANUFACTURERS OF PACIFIC TINNED STEELCASE METERS
whose remarkable accuracy through years of service
makes them superior for measuring domestic and commercial loads.

COMPLETE REPRESENTATION INCLUDING STOCK AND ADVISORY SERVICE ON THE FOLLOWING LINES:

AMERICAN METER COMPANY, Inc.
Positive Displacement Gas Meters, Orifice Meters and Accessories, Laboratory and Gas Service Apparatus

RELIANCE REGULATOR CORPORATION
With this company we offer a cooperative sales service

CROSBY STEEL GAGE & VALVE COMPANY
High quality gages for every purpose—Safety and Relief Valves of improved design

TAYLOR INSTRUMENT COMPANIES
We represent this well known line in Southern California

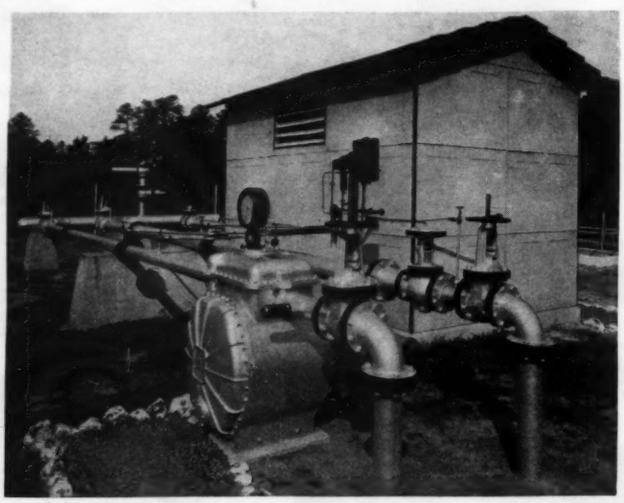
THE MERIAM COMPANY
Manometers of various designs and for numerous applications

ROBINSON ORIFICE FITTING COMPANY
Simplified orifice fittings of sound principle and design

PACIFIC METER WORKS of AMERICAN METER COMPANY, Inc.

495 Eleventh St., SAN FRANCISCO, CALIF. · 2118 Atlantic St., LOS ANGELES, CALIF.

EXAMPLES OF



THIS LOAD VARIES 50 TO 1
. . . Yet the Metric Differential Valve Permits it to be Measured Accurately

A boiler load that varies from 2,000 to 100,000 cubic feet per hour is measured by this installation.

The equipment consists of one 500-B Ironcase Meter in a combination with a 100" and 10" duplex Westcott Orifice Meter, and a Metric Differential Valve. The latter automatically cuts in and cuts out the Orifice Meter for high loads and low loads.

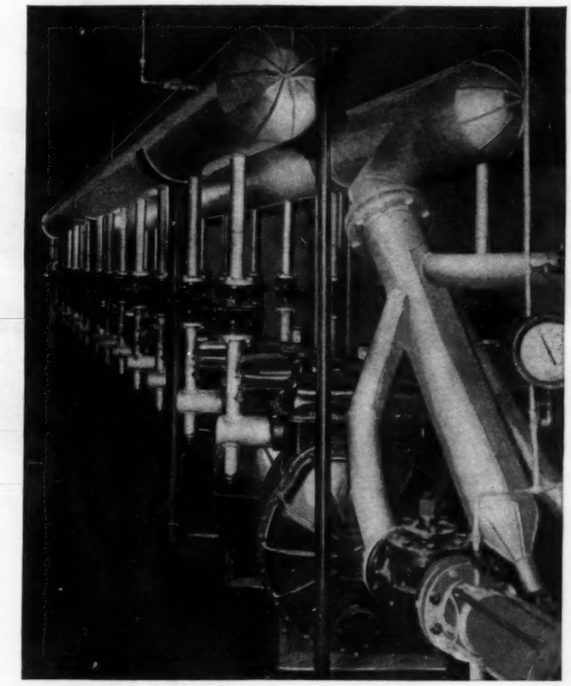
Thus the Metric Ironcase Meter measures the low loads, the Westcott Orifice Meter and the Ironcase Meter together measure the peak loads. The Metric Differential Valve and its functions are completely described by American Meter Co. Bulletin E-17. This will be sent on request.

*Write also for complete information on Metric Rate Volume Controllers and Metric Integrating Orifice Meters and Flowmeters.

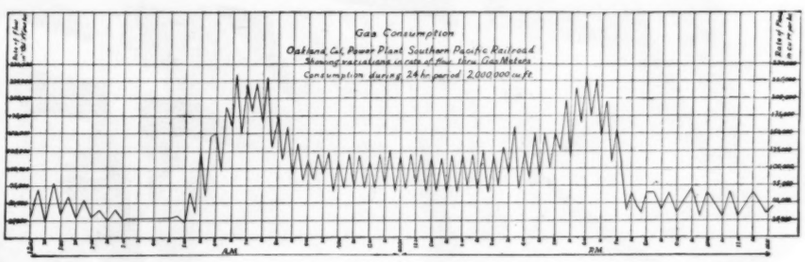
METRIC METAL WORKS of AMERICAN METER COMPANY
INCORPORATED
ERIE, PENNSYLVANIA

PACIFIC SALES SERVICE . . . PACIFIC METER WORKS . . . Los Angeles . . . San Francisco

ADAPTABILITY



These meters measure the gas consumed at the Power Plant of the Southern Pacific Railroad, Oakland, California. They are equipped for testing in place by the Critical Flow Orifice Prover . . .


Gas Consumption
Oakland Cal. Power Plant, Southern Pacific Railroad
Showing fractional rate of flow thru Gas Meters
Consumption during 24 hr. period 2,000,000 cu. ft.
A.M.
P.M.

The Oakland Plant supplies current for operating commuting trains. Notice the sudden peak gas demands which must be measured in the early morning and late afternoon.

Gas companies have found Metric Ironcase Meters efficient and economical, under a wide range of applications and for pressures varying from a few inches to several hundred pounds . . .

In solving special requirements in gas measurement, many have found the experienced counsel of American Meter Company engineers of value. This service does not obligate in any way. Ask for it.

METRIC METAL WORKS of AMERICAN METER COMPANY

INCORPORATED

ERIE, PENNSYLVANIA

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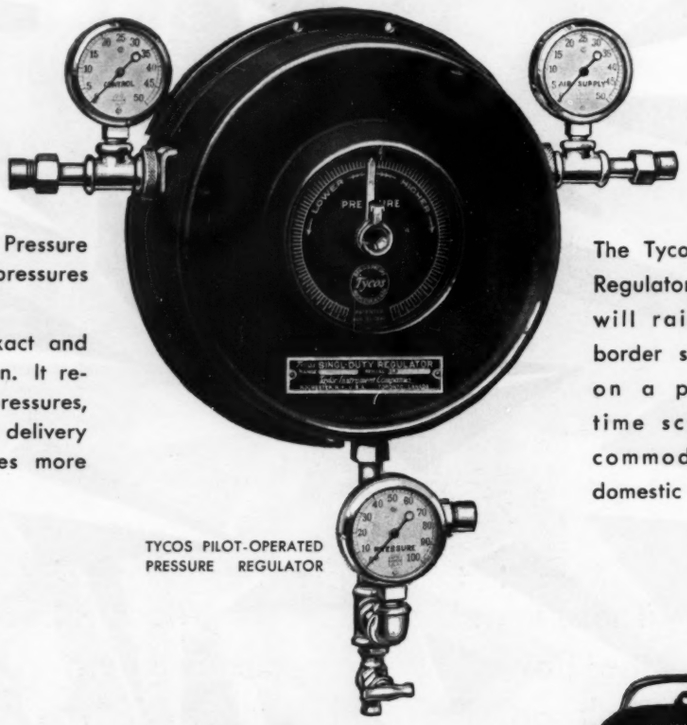
Tycos INSTRUMENTS

PRODUCE ACCURATE RECORDS of Temperature Pressure, and Rate of Flow



TYCOS PILOT-OPERATED PRESSURE REGULATOR

The Tycos Pilot-Operated Pressure Control maintains constant pressures under fluctuating loads.

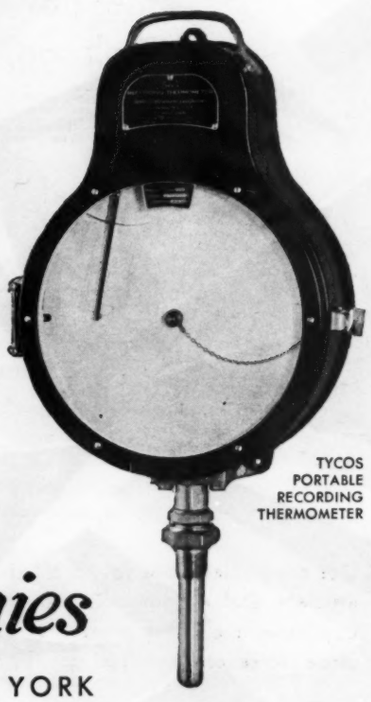
This instrument offers an exact and flexible system of regulation. It reduces well pressures to line pressures, and it controls gathering or delivery system pressures. It enables more accurate flow measurement.

The Tycos Pressure-Tyme Regulator, pilot-operated will raise and lower border station pressures on a predetermined time schedule to accommodate changing domestic loads.

TYCOS INDUSTRIAL THERMOMETER

Other Tycos Instruments widely used in the Natural Gas industry include Tycos Industrial Thermometers, Portable and Stationary Recording Thermometers.

Tycos Bulletin No. 32 gives complete information on Tycos Instruments for the Natural Gas industry. Copies are available on request.



TYCOS PORTABLE RECORDING THERMOMETER

Taylor Instrument Companies

ROCHESTER - - - NEW YORK

In Canada, *Taylor Instrument Companies* of Canada, Ltd., *Tycos* Building, Toronto

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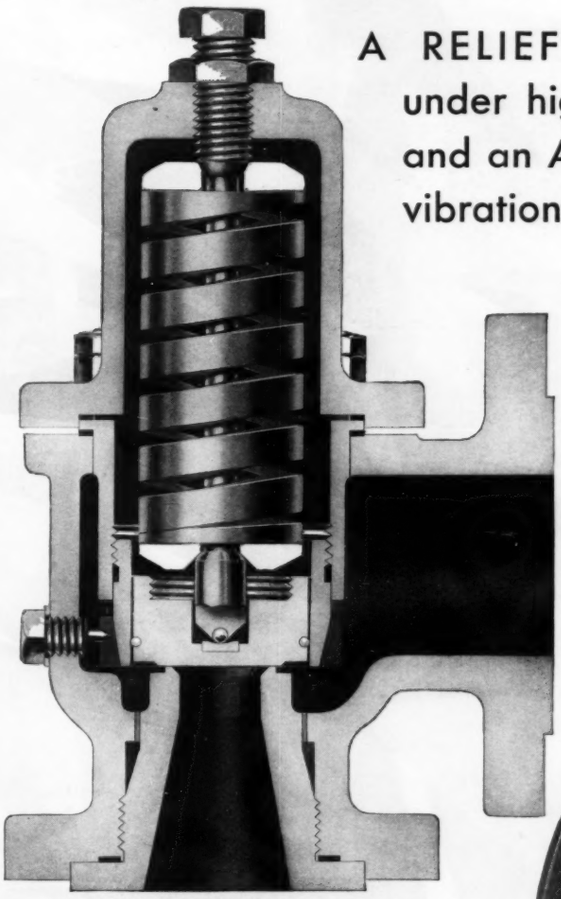
TWO CROSBY ITEMS

of Special Interest to Natural Gas Men



A RELIEF VALVE for exacting service under high temperatures and pressures and an ALL STEEL GAGE that withstands vibration and pulsating high pressures.

Notice that the Crosby Relief Valve, Style JJ, has a specially designed full flanged nozzle and has guides above the seat. These features relieve the body from pressure; and permit a maximum discharge capacity—approximately 97% of the theoretical discharge of the orifice.

We are also prepared to furnish relief valves equipped with lifting gear but tight on the discharge side.

SEE CATALOG 100 FOR A FULL DISCUSSION.

Crosby Heavy Duty All Steel Gages, Style AlH, are exceptionally accurate and long lived on severe service where vibration and rapidly pulsing pressures would quickly wear out regular gages. The Crosby circular, "Crosby All Steel Gages" describes this and other superior gages.

CROSBY STEAM GAGE & VALVE COMPANY

INCORPORATED 1786

BOSTON U. S. A.

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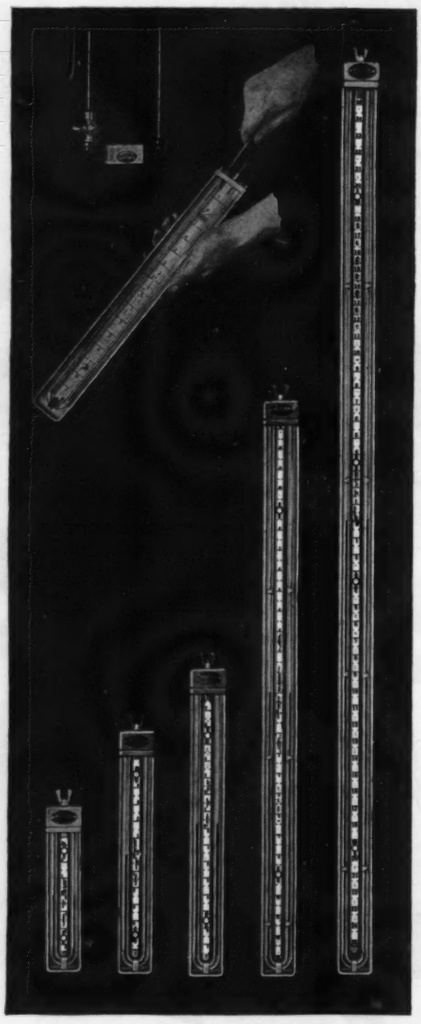
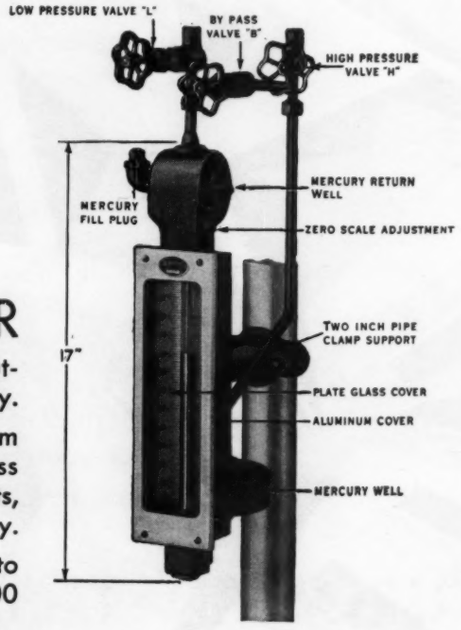
CLEAN-OUT MANOMETERS

The MERIAM COMPANY'S latest improved type



Without disturbing the piping, the cast iron head can easily be removed for cleaning—with a brush which is supplied. A light, strong aluminum frame gives thorough protection to the tubes. These are of "Pyrex" or Borosilicate glass. For easy reading, the aluminum scale is etched with large figures.

Meriam Manometers are good for working pressures up to 500 pounds per square inch, and are manufactured in all lengths for every commercial purpose.



INDICATING FLOW METER

Meriam Type "E" Indicating Flow Meters have many outstanding features that contribute to permanent accuracy.

These include an easily read scale that is protected from dirt by a plate glass cover, "Pyrex" or Borosilicate glass tubing, all steel valves with self-centering monel metal seats, and a mercury return well that prevents loss of mercury.

Meriam Type "E" Indicating Flow Meters are easy to install and are made for line pressures from 0 to 1000 pounds per square inch.

Send for bulletins and prices covering Meriam Products listed on the center page of this insert.

THE MERIAM COMPANY . . . Cleveland, Ohio

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RELIANCE REGULATORS

MAINTAIN UNIFORM PRESSURE FOR Manufactured, Natural and Butane air gases

SPRING LOADED

DEAD WEIGHT

Reliance "Type H" Regulators maintain uniform delivery pressures at extremely high rates of flow and have an exceedingly low lock up.

They are made in spring loaded or dead weight types, with or without a mercury seal.

Valve and valve seats are easily accessible for inspection and replacement through the hand hole, and adjustments for changing pressure are readily made.

Reliance Regulator Corporation also manufactures a high grade line of industrial or district regulators and "A" type appliance regulators either with or without safety feature.

RELIANCE REGULATOR CORPORATION

1000 Meridian Avenue, Alhambra, California

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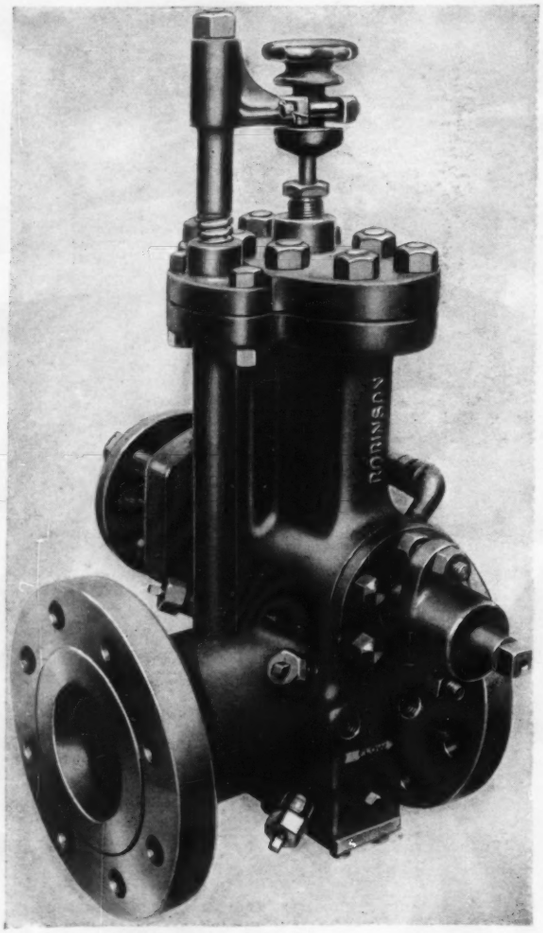
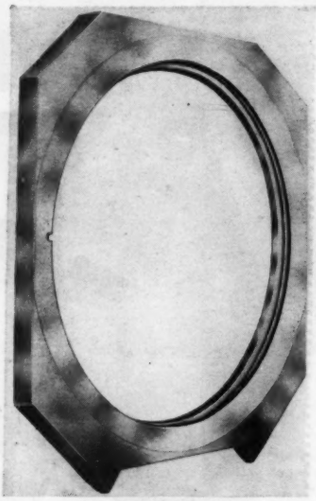
ROBINSON ORIFICE FITTINGS

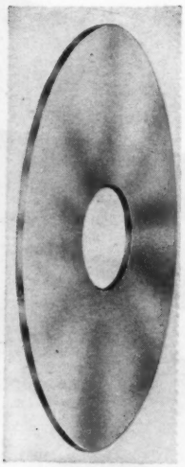
SIMPLIFY THE METHOD OF CHANGING OR INSPECTING AN ORIFICE METER PLATE



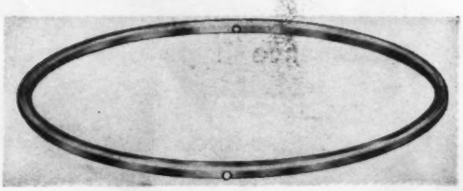
ROBINSON ORIFICE FITTING, Cast Steel Type — 500 pound working pressure. Similar in design and construction is the Standard Service-Steel Type—125 pound working pressure.



CARRIER



ORIFICE INSERT



SEALING RING

This prevents delay in adapting the meter to changed flow conditions. It also encourages frequent inspection, and micrometer checking of the orifice diameter.

The design and construction of Robinson Orifice Fittings save space, materials and labor, prevent gas losses and by-pass leakage and assure accurate orifice centering.

BETTER METERING IS THE RESULT.

Descriptive literature will be sent upon request.

The Rofco Orifice Plate is so designed that after once purchasing the plate for a Robinson Orifice Fitting, it is only necessary to purchase Orifice Disc Inserts. This assures great savings for users of Robinson Orifice Fittings.

ROBINSON ORIFICE FITTING CO.

1435 Santa Fe Avenue, Los Angeles

The Pacific Meter Works presents a complete line of equipment for measuring and controlling gas, oil, and water. This includes products of American Meter Company, as well as those for which we act as agents.

PACIFIC METER WORKS · LOS ANGELES · SAN FRANCISCO

Full information will be supplied on request.

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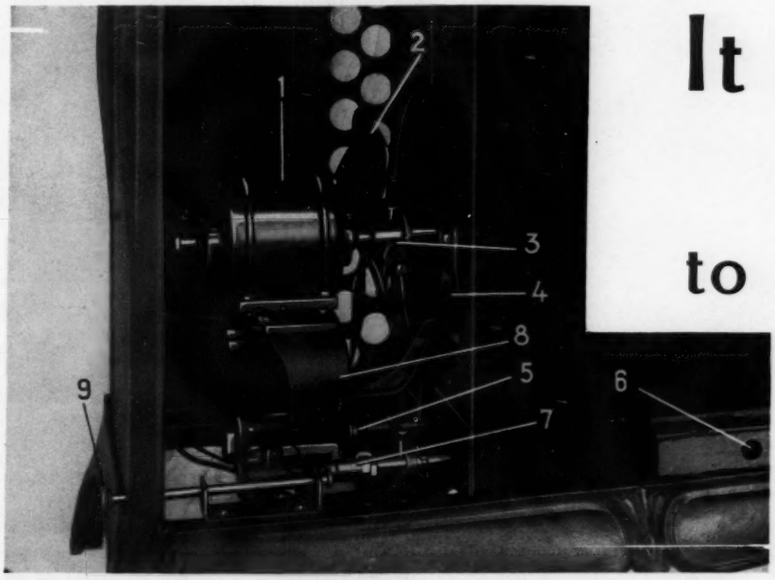

It takes *Circulation* to circulate heat

The heart of the Ambassador, the fan forced circulation system:

(1) Small motor operating fan (2) and governor (3), which opens and closes gas valve after motor starts and stops.

(2) Motor driven fan forces room air over cast aluminum radiating elements inside of the heater.

(3) Governor, which opens gas valve when motor starts.

(4) Operating arm from governor to gas valve.

(5) Gas valve.

(6) Opening for lighting pilot and inspecting burner combustion.

(7) Thermal cutout union. The Ambassador will not operate unless the pilot is burning.

(8) Motor and fan system support.

(9) Pilot button for relighting gas supply after pilot has been extinguished—a complete safety pilot.

Simple gravity circulation is not enough. Our experience with the Humphrey industrial Unit Heater proved that fan forced circulation of the heated air is necessary to produce a maximum efficiency in usable heat. With forced circulation, there is immediate and uniform warmth throughout the entire room in which the heater operates. With the Ambassador, the heat is placed where it is wanted: at the floor level instead of the ceiling.

Compact in construction and artistic in design, the Ambassador is at once a highly efficient central heating plant and a beautiful piece of household furniture. The radiating elements are cast aluminum, impervious to rust and corrosion. The cabinet is finished in rich duo-tone walnut. Full automatic temperature control completes the combination of efficiency, beauty and comfort.

A HUMPHREY PRODUCT

General Gas Light Company
Kalamazoo, Michigan

C. B. Babcock, Pacific Coast Mgr., 135 Bluxome St., San Francisco

EXTRA VALUE is usually an intangible quality. Not so with FISHER House Service Gas Regulators. It is there in appearance. It is there in rugged strength and above all it is there in superior regulation. Constructed to order, for all kinds of gas. For initial pressures up to 300 lbs. and all standard reduced pressure ranges. Sizes ¾" to 2", having vertical or horizontal pipe connections. With or without safety reliefs. FISHER manufactures a complete line of gas regulators for all services, and each is constructed to especially meet conditions on your order.

Catalog G31, and information gladly furnished.

Fisher Governor Company

201 SOUTH FIRST AVENUE
MARSHALLTOWN, IOWA

FISHER TRADE MARK

1015 SANTA FE AVENUE
LOS ANGELES, CALIF.

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WESTERN GAS

'Reg. U. S. Pat. Off."

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OFFICIAL PUBLICATION:

THE PACIFIC COAST GAS ASSOCIATION

AND

THE SOUTHERN CALIFORNIA METER ASSOCIATION

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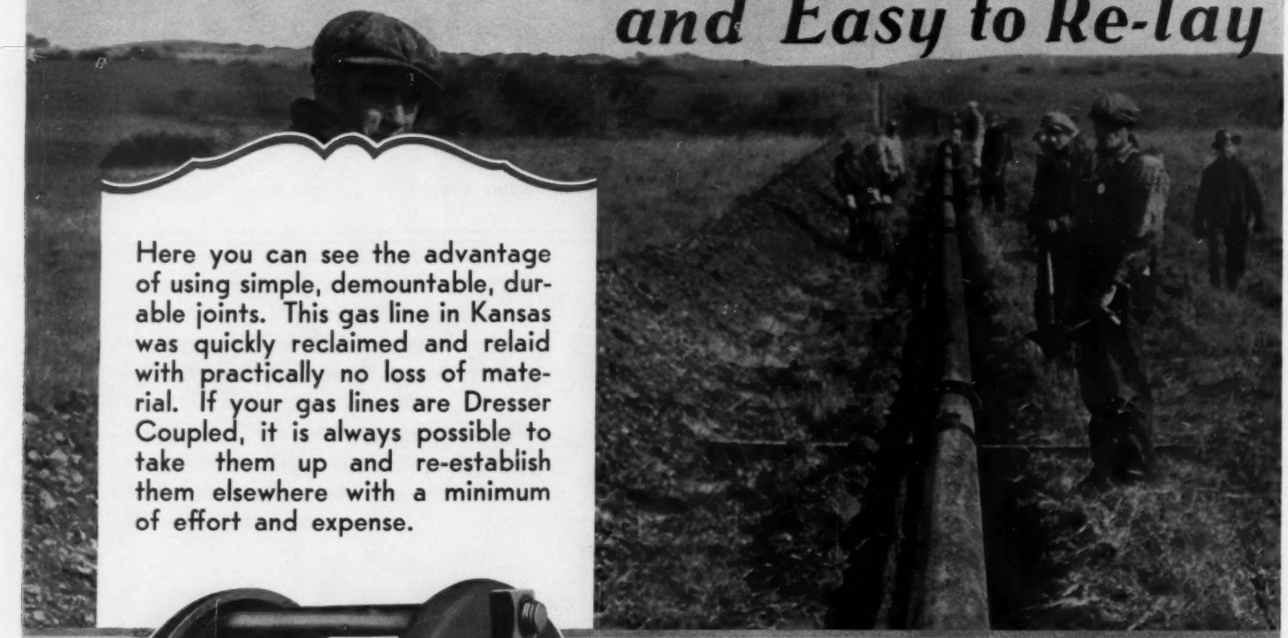
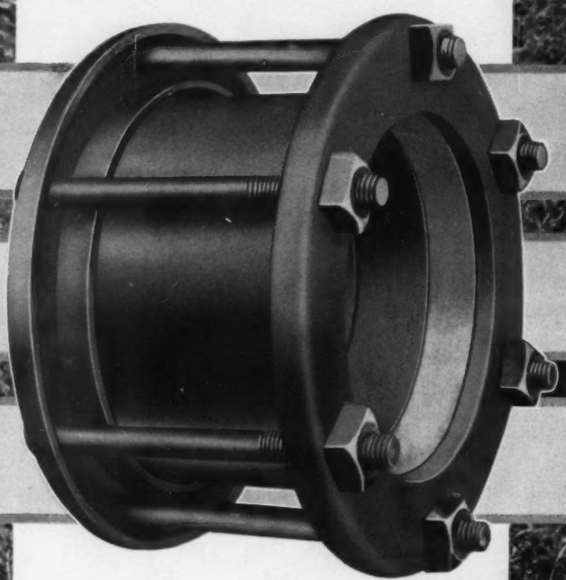
EASY TO RECLAIM

and Easy to Re-lay



Here you can see the advantage of using simple, demountable, durable joints. This gas line in Kansas was quickly reclaimed and relaid with practically no loss of material. If your gas lines are Dresser Coupled, it is always possible to take them up and re-establish them elsewhere with a minimum of effort and expense.



DRESSER COUPLINGS

Dominate!

If the pipe in a Dresser-Coupled line ever needs reconditioning, the Couplings are readily unbolted and just as readily bolted again. Pipe that has become pitted on the bottom can be turned over and put in shape for many years of additional service. Two maintenance-saving features of every Dresser line, regardless of its age, are ***absolute*** tightness and extreme flexibility of the joints.

S.R. DRESSER MANUFACTURING CO.
BRADFORD, PA.
In Canada: Dresser Mfg. Co., Ltd., 32 Front St., W., Toronto, Ont.

May, 1932

WESTERN GAS

Vol. VIII, No. 5

"Reg. U. S. Pat. Off."

A Monthly Journal of the Gas and Gas Appliance Industries in *Western America*

An Invitation *to* Tulsa

. . . . . *from the Host*

THIS year during times when the Nation's economic structure is undergoing a slow rebuilding, conventions should bear fruit. All gatherings should show the definite results of constructive and keen thinking. When this is done those who attend such conventions will return to their respective communities more eager to aid in hastening the return of a better era in business.

With this thought resting prominently in the foreground, Tulsa, Oklahoma, and the Oklahoma Natural Gas Corporation anxiously await the delegates who will attend the annual meeting of the Natural Gas Department of the American Gas Association. We take this opportunity to welcome you cordially to the Convention.

Tulsa is the oil capital of the world and as such is also a natural gas center. Part of the program will be an inspection of the Oklahoma Natural Gas Corporation's system, consisting of more than 3,000 miles of pipe line and drawing gas from more than 1,000 wells in 45 different fields. Facilities for the maintenance of dependable service to the company's 62 cities are among the best in the world and engineers who have seen the net work have been lavish with their praise.

Delegates will see in Tulsa a wonder city. It is one of the cleanest cities in the United States, due to the almost exclusive use of natural gas for fuel. And Tulsa has all the coloring and attributes of a progressive city. Its skyline will amaze and its hundred-and-one other features will please.

Just remember the dates, and that Tulsa and the Oklahoma Natural Gas Corporation await you. Let us urge that you attend the convention—May 9, 10 and 11.

Ed Olsen

President, Oklahoma Natural Gas Corp.
Chairman, Convention Arrangements.

. . . *from the Secretary*

AS registrations for the Natural Gas Department meetings stream into Department headquarters it becomes more and more evident that this convention will bring together the most representative gathering of natural gas officers which we have had in recent years. A great number of executives are signifying their intention to be in Tulsa, and the registrations come from all points of the country.

We sincerely believe that this is one meeting which natural gas men cannot afford to miss, and that the benefits and ideas they will get during this Tulsa Convention will far outweigh the time and expense involved by attendance.

A. C. Higgins

Secretary, Natural Gas Department
American Gas Association.

. . . *from the Chairman*

ON behalf of the Natural Gas Department of the American Gas Association, I extend a most cordial invitation to all those of the natural gas industry to attend the Annual Convention of the Natural Gas Department to be held in Tulsa, Oklahoma, May 9, 10 and 11.

An outstanding program has been arranged on which will appear many prominent and nationally known men who will discuss problems that will be of vital interest to all those attending.

All committees of our Association have been exceptionally active during the past year and the Convention will serve as a melting pot for all of the valuable information that has been gathered.

Probably never in its history has the natural gas industry been confronted with so many problems as at the present time, and this fact was foremost in the minds of the program committee in making their selection of convention subjects and men to discuss them. Every session will be extremely interesting and instructive.

A wealth of valuable information awaits those who attend our Convention at Tulsa and a hearty invitation is extended to you to be with us.

J. E. Stubbs

Chairman, Natural Gas Dept.
American Gas Association.

R. W. Gallagher
President
A. G. A.

Alexander Forward
Managing Director
A. G. A.

L. K. Langdon
Vice-Chairman
Nat. Gas Dept.

H. C. Cooper
Ch. Advisory
Committee

H. C. Morris
Ch. Program
Committee

B. F. Pickard
Ch. Publicity
Committee

At Right:
E. N. Watkins
Ch. Uniform
Classification
of Accounts

L. B. Denning
Ch. Conservation
Committee

D. L. Cobb
Ch. Federal Taxation
Committee

At Left:
R. D. Creveling
Ch. Committee on
Natural Gas
Company Dues

The Order of Events at Tulsa

FOR its 1932 convention background the A. G. A. Natural Gas Department has selected one of the oldest and most important of natural gas production and consumption centers. Tulsa, a modern metropolis owing much of its prosperity to Oklahoma's gas and oil development, is declaring open house to the natural gas industry during convention dates—May 9 to May 11, inclusive.

Convention committees have seen to it that everything is in readiness for the invasion of natural gas men. E. A. Olsen, president of Oklahoma Natural, has acted as chairman of the general arrangements committee. The program committee, under the chairmanship of H. C. Morris, president and general manager of the Dallas Gas Co., has drawn together a speaking program of high merit, built around the problems which are uppermost in the industry at this time. Convention publicity has been directed by B. F. Pickard, vice-president of the Oklahoma Natural Gas Corp. William B. Way, general manager of the International Petroleum Exposition and Congress, heads the local entertainment committee which will look to the well-being of convention guests.

At another point in this issue Department Chairman T. J. Strickler, Secretary A. E. Higgins, and General Arrangements Chairman E. A. Olsen extend a convention welcome to natural gas men through the pages of *Western Gas,* promising that the Tulsa meetings will leave no one disappointed.

All convention general sessions will be in the Crystal Ball Room of the Mayo Hotel. The program events arranged in their chronological order, are published in these pages.

MONDAY, MAY 9—OPENING SESSIONS

9:00 A. M.

Joint meeting of the Sub-Committee on Code for Testing Natural Gas for Gasoline Content and a Committee of the Natural Gasoline Association of America—Main Private Dining Room, Mezzanine Floor, Mayo Hotel.

10:00 A. M.

Meeting of the Main Technical and Research Committee and Sub-Committees—Main Private Dining Room, Mezzanine Floor, Mayo Hotel.

2:00 P. M.

Opening Remarks by the Chairman—*T. J. Strickler,* Chairman, Natural Gas Department

Invocation—*Dr. C. W. Kerr,* Pastor First Presbyterian Church, Tulsa, Oklahoma

Address of Welcome—*Herman F. Newblock,* Mayor of Tulsa

Address—*E. A. Olsen,* President, Oklahoma Natural Gas Corp., Tulsa, Oklahoma

Address of the Chairman—*T. J. Strickler,* Vice-President, Kansas City Gas Co., Kansas City, Mo.

Appointment of Committee on Chairman's Address—*L. K. Langdon,* Vice-Chairman, Natural Gas Department

Presidential Address—*R. W. Gallagher,* President, American Gas Association

"Association Work"—*Alexander Forward,* Managing Director, American Gas Association

"This Changing World" (A talk on oil, gas and the banks and their relation to public welfare)—*Walter Ferguson,* Vice-President, Exchange National Bank, Tulsa, Okla.

Informal Addresses by Gas Company Executives—*F. L. Chase,* Vice-President, Lone Star Gas Co., Dallas, Texas

6:00 P. M.

Automobiles leave Mayo Hotel for Barbecue and Dance

6:00 P. M.

Meeting of the Managing and Advisory Committees, Natural Gas Department—French Room, Mezzanine Floor, Mayo Hotel.

7:00 P. M.

Annual Dinner, Managing and Advisory Committees, Natural Gas Department—English Room, Mezzanine Floor, Mayo Hotel.

TUESDAY, MAY 10

9:30 A. M.

Appointment of Committee on Final Resolutions—*T. J. Strickler,* Chairman, Natural Gas Department.

"Dealer Cooperation, the Need and Justification for Utility Selling"—*LeRoy M. Edwards,* Southern Counties Gas Co., Los Angeles, Calif.

"Dealer Cooperation by Affiliated Associations"—*A. E. Bettis,* Missouri Association of Public Utilities, Kansas City, Mo.

"Our Main Technical and Research Committee"—*H. C. Cooper,* Hope Natural Gas Co., Pittsburgh, Pa.

"Developing New Uses for Gas and the Need for Such Accomplishment"—*Henry O. Loebell,* Combustion Utilities Corp., New York City, N. Y.

1:00 P. M.

The official Convention photograph will be taken at the close of the Tuesday morning session.

Bridge luncheon for the ladies—Tulsa Club.

2:00 P. M.

"General Conditions in the Industry"—*E. B. Reeser,* Barnsdall Corp., Tulsa, Okla.

"Rate Legislation and Taxes"—*Judge H. O. Caster,* Henry L. Doherty and Co., New York City, N. Y.

"Large Diameter Transmission Lines"—*E. F. Schmidt,* Lone Star Gas Co., Dallas, Texas.

"Water Vapor in Natural Gas"—*C. H. M. Burnham,* Colorado-Wyoming Gas Co., Denver, Colo.

7:00 P. M.

Cabaret Banquet and Dance—Crystal Ball Room, Mayo Hotel.

WEDNESDAY, MAY 11

9:30 A. M.

"Wrinkles"—*H. J. Hoover,* Cincinnati, Ohio.

"Natural Gas Fellowships"—*J. B. Tonkin,* Peoples Natural Gas Co., Pittsburgh, Pa.

"Recent Deep Drilling and Large Pipe Line Construction Practice in the East"—*H. A. Wallace,* United Fuel Gas Co., Charleston, W. Va.

"Conservation of Gas in Completion of Well Drilling and Gas Well Deliveries"—*N. C. McGowen,* United Gas Public Service Co., Houston, Texas, and *E. L. Rawlins,* U. S. Bureau of Mines, Bartlesville, Okla.

"General Utility Situation"—*J. F. Owens,* President, National Electric Light Association, Oklahoma City, Okla.

"Rumania's Burning Well"—*M. M. Kinley,* Kinley Brothers, Tulsa, Okla.

2:00 P. M.

"Major Future Sales Problems"—*Samuel Insull, Jr.,* Midland United Corp., Chicago, Ill.

"Problems Met in Saturation, Measurement and Control in Gas Lines"—*W. W. Frymoyer,* The Foxboro Co.

"Question Box and Discussion"—*J. D. Creveling,* Henry L. Doherty and Co., New York City, N. Y.

Report of Committee on Chairman's Address.

Report of Committee on Final Resolutions.

Final Business and Closing Remarks.

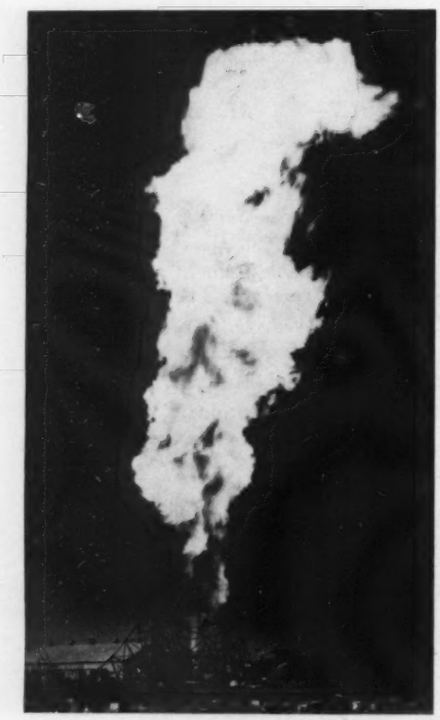
Oklahoma Natural Gas Corp., headquartered in the Natural Gas Department convention city, serves 62 Oklahoma communities and operates more than 3,000 miles of transmission system. Pictured above is the company's Tulsa headquarters.

Natural Gas... Major Industry In *the* "Sooner" State

By E. F. McKAY

Manager, Oklahoma Utilities Association

OKLAHOMA is 100 per cent natural gas. For those who shortly will be converging upon Tulsa, Natural Gas Department convention site, Mr. McKay here fills in the picture of gas service expansion in his state. The author directs the affairs of one of the livest of regional utility associations, and knows whereof he speaks.—EDITOR.



"NATURE'S BLOW-TORCH"—*Conclusive evidence of natural gas in Oklahoma. A 125,000,000-foot 2,000-pound rock pressure gas well in the Oklahoma City field—Amerada Petroleum Corp.'s Kinter No. 5. The fire occurred in October, 1929, and defied fire-fighters for five days.*

A LEADING gas company executive whose operating territory had not yet been invaded by natural gas, commenting in 1930 upon the expansion of the natural gas industry, said: "It is not only amazing; it is appalling."

Oklahoma gas executives never have had to face in a large way the problem of adjusting their situation to the advent of natural gas. For many years Oklahoma has had the distinction of being a state with no gas except "The Magic Fuel," and the expansion of the natural gas industry in this state has been the expansion of the gas industry itself.

The production, transmission and distribution of natural gas is one of Oklahoma's major industries. Its development began approximately 30 years ago, but has taken place largely within the last 10 or 12 years. Up to 1930 Oklahoma was for several years the leading state in natural gas production; but with the construction of thousand-mile pipelines, and the opening to Texas Panhandle gas of markets justifying these gigantic construction projects, Oklahoma yielded production honors to the Lone Star State.

The estimated value, at point of consumption, of natural gas produced in Oklahoma in 1930, the latest year for which production figures have been released by the United States Bureau of Mines, was $47,691,892. This was based on a total output of 348,116,000,000 cubic feet and an average value at point of consumption of 13.7 cents per M cubic feet. Domestic and commercial consumption in Oklahoma that year, by 236,000 consumers, used 28,206,000,000 cubic feet, the remainder of the gas accounted for being used for industrial purposes, including well drilling, pumping, operating gasoline plants, operation of petroleum refineries, electric public utility power plants, cement plants and other industries, with some, but comparatively negligible, use in the manufacture of carbon black.

While the beginning of the natural gas transmission and distribution industry in Oklahoma dates back to 1903, some artificial gas service had been established in the state prior to that date. The first plant appears to have been installed at Guthrie in 1901, when that city granted a franchise to William H. Frost. The Oklahoma City Electric, Gas and Power Co. in February of the following year was granted an artificial gas franchise in Oklahoma City.

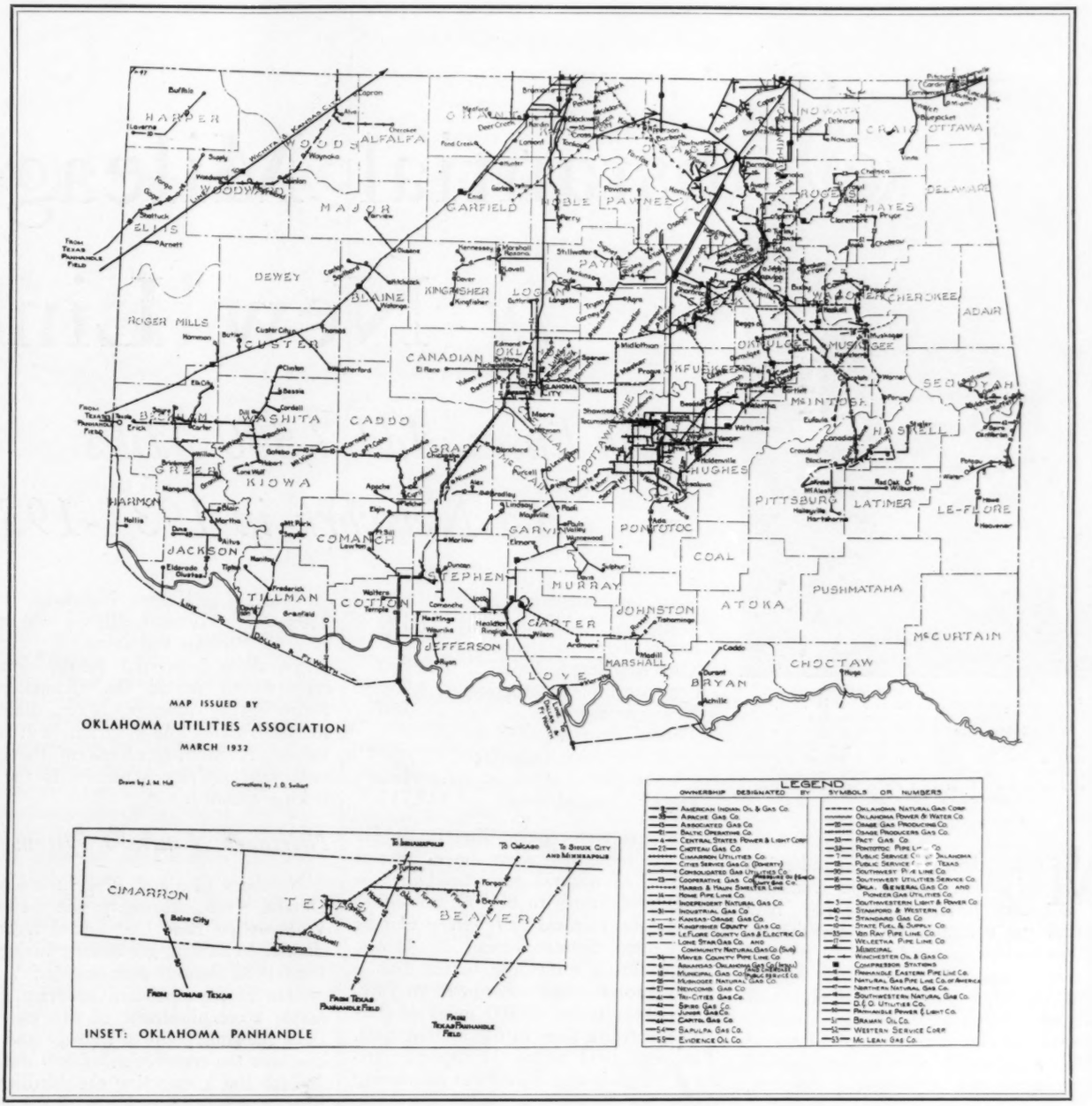
Natural Gas Beginnings

Red Fork, then in Indian Territory, now a part of Tulsa, was the first town in the state to secure natural gas service. C. F. Colcord of Oklahoma City, Robert Galbreath of Tulsa and the late C. G. Jones of Oklahoma City, constructed and owned the lines. The same people in 1904 constructed a line into Tulsa from a gas well between Red Fork and that city. The line was seven miles long and was considered a great accomplishment in southwestern engineering circles. Before service was established in Tulsa, in September of that year, the system was sold to Glen T. Braden of Waterford, Penna., who in 1906 organized the Oklahoma Natural Gas Co., now the Oklahoma Natural Gas Corp.

That company, always the largest factor in Oklahoma's natural gas industry, the same year laid a 12-inch trunk line from the gas field near Red Fork to Oklahoma City, Shawnee, Guthrie and other points. This was not only the beginning of the great Oklahoma Natural system, which now taps 40 gas fields and has 125,000 customers, but was the pioneering effort in the construction of larger transmission lines, which have been developed until transmission lines more than 1,000 miles in length are no longer considered sensational.

240 Towns in 10 Years

A period of 18 years was required by the gas companies operating in Oklahoma to reach 100 cities and towns with their service. Since 1921, however, the gas companies have carried their lines and distribution systems to 240 additional towns, making a present total of approximately 340 Oklahoma towns with natural gas service. Even five



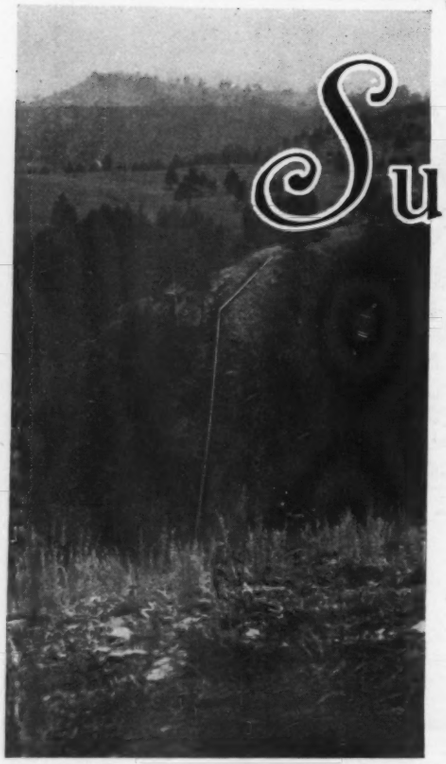
Natural Gas Lines and Compressor Stations in Oklahoma

years ago many of the counties in the west half of Oklahoma were without natural gas lines, and depended largely upon coal for their fuel, as little natural timber existed in that section. A shortage of coal, due to strikes among coal miners or other causes, was then a serious matter for the people living in that section of the state.

With the construction in 1928 of a 14-inch line by the Consolidated Gas Utilities Co., extending 165 miles from gas fields in Wheeler County, Texas, to Enid, Oklahoma, and southern Kansas, and the 20-inch line by the Cities Service Gas Co., 500 miles long, from the Texas Panhandle field through Oklahoma to Wichita, Kansas, and its Kansas and Missouri markets, the western section of Oklahoma began to secure release from practical dependence upon coal. Prior to that time some of the towns in extreme western and southwestern Oklahoma had natural gas service from wells in the Sayre field and lines of the Lone Star Gas Co., but the greater portion of western and northwestern Oklahoma had no gas lines. Later development of gas producing areas in the Panhandle section and in the Hugoton district of southwestern Kansas, brought natural gas service to the Oklahoma Panhandle section also.

In addition to its local lines the Oklahoma Panhandle is now crossed by three big interstate gas lines from 900 to 1400 miles in length. They all draw their principal supply from the Texas Panhandle gas fields, and extend to northern and eastern markets. These lines are now being operated by the Natural Gas Pipeline Co. of America to Chicago, the Northern Natural Gas Co. to points in Iowa and Minnesota, and the Panhandle Eastern Pipe Line Co. to Indianapolis and other eastern points. These lines also serve many cities and

(Continued on Page 88)



Rough going did not stop the pipeliner in 1931. Montana Power Co. crews, constructing the Cut Bank-Butte line, dropped 20-inch pipe into Sheepnose Canyon, where the incline is greater than a 45-degree angle and the depth of the canyon is about 600 feet. The pipe was lowered into place from hills on either side and connected at the bottom.

Substantial Mileage *in* New Line

Pipeliners Add 7,500 Miles To Network in 1931-1932

MORE than seven thousand miles of added natural gas transmission lines, nearly 400 new natural gas communities, more than a million meters changed over to natural or mixed gas and millions of dollars spent on other phases of development and construction were the gas industry's solution for the economic problems of 1931—a splendid contribution toward stemming the tide of industrial recession.

Practically every major gas transmission line scheduled in *Western Gas'* 1930-1931 survey to be brought to completion in 1931 was placed in service, and many other developments planned since May, 1931, have been brought to a successful conclusion. In addition to extensive western activity, markets in New York, Pennsylvania, the Virginias, Ohio and Indiana also have been opened for natural gas from newly discovered fields in Kentucky, New York and Pennsylvania with resulting major pipe line construction programs, as shown in the accompanying tables. Compilation of these figures was made possible through the hearty cooperation of companies represented therein.

The current reviews of gas transmission line construction and new service area show the following significant totals:

New transmission line mileage, 1931	7,500
Lines under construction or completed, 1932	700
Proposed line construction	4,700
New gas towns	370
Towns changed over to natural from manufactured gas	130
Meters changed over	1,142,715

The gas transmission line totals for 1931 as tabulated above have jumped the total of natural gas trunk lines in the United States to 62,500, according to estimates released to *Western Gas* by the United States Bureau of Mines. This indicates something better than a 50 per cent increase subsequent to July, 1929, there being 40,800 miles of natural gas trunk lines in use at that time. The year 1931 added Minnesota, Arizona, Virginia and Florida as consuming states.

Along with added gas transmission line mileage, the curve of gas consumer growth shows a marked upward trend. In addition to these 500 new natural gas towns named above, 83 communities of 254,206 population were served from central liquefied petroleum gas plants. The year 1932 up the end of March has seen 44 towns with a population of 39,453 served with gas for the first time and 91,818 manufactured gas customers changed over to natural in 19 towns.

As has been the case since the discovery of Texas, Kansas and Oklahoma gas fields several years past, the center of gas transmission line activity has been in the Mid-Continent-Mid-West area, with fields in these states as the source of supply. Construction of laterals and extensions from major carriers have advanced the work of consolidating natural gas markets in Kansas, Nebraska, Iowa, Minnesota, Missouri, Illinois and states even farther east and south.

To those interested in the detailed construction record the accompanying forms giving mileage, route, diameter for the various line programs will be of value. A running review of the more important activity is offered in the following account.

Northern Natural's System

Northern Gas and Pipe Line Co., of Omaha, Neb., formerly the Missouri Valley Pipe Line Co., added a bright chapter to natural gas history during the 1931-1932 period, with successful completion of its scheduled program. The major accomplishment of this company from the standpoint of mileage and pipe size was the completion of 180 miles of 26-inch line connecting the Mullinville, Kan., compressor station with the one at Clifton, serving several towns enroute and completing the company's main line system. Until this link went into operation, gas from the fields in Kansas and Texas was routed through the Kansas Pipe Line & Gas Co.'s system to Clifton. The 26-inch connecting line gives the company a direct carrier from Texas fields into cities and towns in Minnesota, a distance of 751 miles. In addition to this, 86 miles of 14-inch line took gas into Sioux Falls, S. D. and pioneered the eastern area of the state for "natural." Several lines are scheduled to be extended from this carrier, among them one to Pipestone, Minn., a distance of 40 miles, and another to Yankton, of approximately the same length. Extensions which Northern Gas and Pipe Line Co. made during the year took gas to such communities as Mason City, Des Moines

Shown Totals

By R. C. COLLING
News Editor, Western Gas

and Fort Dodge, Iowa; Rochester, Minn.; and Sioux Falls, S. D. No definite construction program has been announced by the company for the coming months other than extensions to take care of normal growth, but it is thought that there is possibility of extending the main line system to Minnesota and St. Paul if those markets are made available.

Northern Gas and Pipe Line Co. though comparatively young in the history of the industry, having been formed in 1930, since its organization has laid nearly 2,000 miles of main and lateral line pipe and has served several thousand consumers. The construction program of the company has been carried on chiefly during the 1931 period and has given work to thousands of men in the Mid-West.

Natural Gas Pipeline Co. of America

Natural gas from the Texas Panhandle penetrated farther into Mid-West territory, with the completion of Natural Gas Pipe Line Co. of America's main 24-inch carrier to Chicago, Ill., at a cost of approximately $75,000,000. More than 900,000 meters were changed over to natural gas in Chicago following the arrival of the new fuel. It was necessary to erect nine compressor stations on the route of the line to boost the gas, each having a capacity of 6,250 h.p. A 15,000 h.p. station was also constructed by the company at Fritch, Texas, and all were completed during 1931. Plans announced by Natural Gas Pipe Line Co. for the 1932 period call for construction of a 20-inch line from the compressor station at Geneseo, Ill., to Milwaukee, Wis., through the densely populated manufacturing district of Northern Illinois, and extension from there to Green Bay, Wis. The 20-inch line will be approximately 180 miles long and the carrier to Green Bay would add 105 miles, making a total of 285 miles of line scheduled to be constructed by the company during the year. The Milwaukee and Green Bay extensions will add Wisconsin to the list of natural gas states, the latter line penetrating the resort territory along Lake Michigan and the paper and lumber milling districts of the state where population figures maintain a steady high level.

Reports credit this company with plans for construction of a parallel line from Texas fields to Chicago, the new carrier to be of 30-inch pipe. Lateral line construction from the existing main line by the company will add new service area

GAS TRANSMISSION LINE CONSTRUCTION 1931-1932

Company	Line Location	Length (Miles)	Size (Inches)	Status
MAJOR INTERSTATE CONSTRUCTION*				
Columbia Gas & Electric Corp.	Point near Pikeville, Ky., through West Virginia across Potomac River to Rockville, Md., where it ties into line laid in 1930 serving eastern Pa.	357	20	Completed, 1931
Columbia Gas & Electric Corp.	Miscellaneous lateral construction from above line	100	..	Completed, 1931
Columbia Gas & Electric Corp.	Muncie, Ind., to Rockville, tying Panhandle Eastern line into Ohio Fuel Gas Co. line.	100	20	Completed, 1931
Continental Public Utilities Co.	Bowdoin field to Regina, Sask.	175	16 or 14	Proposed
Drumheller Interests	Cut Bank gas field in Montana to Spokane, Wash.	250	20	Proposed
Great Northern Gas & Utilities Co.	Eastern Montana fields to Minneapolis	580	24	Proposed Cost, $20,000,000
Lycoming Natural Gas Co.	Tioga field to Onondago, N. Y.	90	20	Completed, 1932 Cost, $2,500,000
Natural Gas Pipeline Co. of America	Portions of Texas-Chicago main line lying in Iowa and Illinois.	415	24	Completed, 1931
Natural Gas Pipeline Co. of America	Compressor station at Geneseo, Ill. to Milwaukee.	180	20	Proposed
Natural Gas Pipeline Co. of America	Milwaukee to Green Bay, Wis.	105	..	Proposed
Natural Gas Pipeline Co. of America	Texas-Chicago, parallel to existing 24-inch line.	1000	30	Proposed
Northern Gas and Pipe Line Co.	Mullinville to Clifton, Kan	180	26	Completed, 1931
Northern Gas and Pipe Line Co.	Sioux City, Iowa to Sioux Falls, South Dakota	86	14	Completed, 1931
Northern Gas and Pipe Line Co.	Pacific Junction, to Ogden	121	24	Completed, 1931
Northern Gas and Pipe Line Co.	Ogden to Mason City	85	20	Completed, 1931
Northern Gas and Pipe Line Co.	Mason City, Ia. to Owatonna, Minn.	64	16	Completed, 1931
Northern Gas and Pipe Line Co.	Owatonna, to Minneapolis and St. Paul	65	16	Proposed
Northern Gas and Pipe Line Co.	Sioux Falls, S.D., to Pipestone, Minn.	40	..	Proposed
Panhandle Eastern Pipe Line Co.	Liberal, Kan., to Louisiana, Mo.	600	24	Completed, 1931
Panhandle Eastern Pipe Line Co.	Louisiana, Mo., to Rockville, Ind.	250	24	Completed, 1931
Power Corp. of Canada	Bowdoin gas field in Montana to Regina and Moosejaw, Sask.	175	..	Proposed Cost, $8,000,000
New York Natural Gas Corp.	Tioga county in northern Pennsylvania to point 10 miles from Syracuse, N. Y.	110	20	Completed, 1932 Cost, $2,750,000
United Gas Public Service Corp.	Kirbyville, Texas to Franklin, La.	45.6 16.4 54.2 31.2 11.7	14 12 10 8 6	Completed, 1931 Cost of United's entire 1931 expansion program $20,000,000
United Light & Power Corp.	Rockville, Ind., to Detroit, Mich.	200	20	Proposed
Western Gas Co.	Ascarate take-off at El Paso to No. 3 compressor station	8	16	Completed, 1931
Western Gas Co.	No. 3 compressor station to Douglas	218	12¾	Completed, 1931 Cost of entire line $6,000,000
Western Gas Co.	Douglas to Bisbee Junction	13	10¾	Completed, 1931
Western Gas Co.	Bisbee Junction to Warren	8	6⅝	Completed, 1931
Western Gas Co.	Warren to Bisbee	3	4½	Completed, 1931
Western Gas Co.	Bisbee, Ariz., to Cananea, Mex.	37	8⅝	Completed, 1931

*Traversing two or more states

GAS TRANSMISSION LINE CONSTRUCTION 1931-1932

Company	Line Location	Length (Miles)	Size (Inches)	Status
CALIFORNIA				
Coast Counties Gas and Electric Co.	Walnut Creek to Danville	7.1	4	Completed, 1931 Cost, $31,619
Coast Counties Gas and Electric Co.	Danville to Diablo	2.1	2	Completed, 1931
Industrial Fuel Supply Co.	Long Beach to Huntington Beach	10.5	16	Under const.
Industrial Fuel Supply Co.	Near Santa Fe Springs to point near La Habra	4.5	16	Completed, 1931
Industrial Fuel Supply Co.	Signal Hill, East	4	16	Completed, 1931
Pacific Gas and Electric Co.	Sacramento-Marysville	50	12 and 16	Proposed
Pacific Gas and Electric Co.	Salinas to Spreckles	5.68	12	Completed, 1931 Cost, $82,000
Pacific Gas and Electric Co.	Riverbank to Escalon	5.11	4½	Completed, 1931 Cost, $35,000
Pacific Gas and Electric Co.	Potrero Gas plant to San Mateo line	7	26	Completed, 1932
Pacific Gas and Electric Co.	Milpitas to San Francisco	45	26	Under const. Cost, $1,870,000
Pacific Gas and Electric Co.	Schellville to Glen Ellen	12	6	Completed, 1931 Cost, $91,000
Pacific Gas and Electric Co.	Vallejo to Petaluma	33	12	Completed, 1931 Cost, $744,000
Pacific Gas and Electric Co.	Miscellaneous short jobs totaling	300	8–2	In progress and proposed
*San Diego Consolidated Gas and Electric Co.	Chula Vista to Otay and San Ysidro	7.8	4	Completed, 1931 Cost, $48,998
*San Diego Consolidated Gas and Electric Co.	From La Jolla to Del Mar, Solono Beach, Leucadia and Carlsbad	4.1 21.4	6 4	Completed, 1931 Cost, $179,605
San Diego Consolidated Gas and Electric Co.	Pose Canyon to San Diego	7	12	Under const.
San Joaquin Light & Power Corp.	Fresno to Merced	6.7 52	12 8	Completed, 1931 Cost, $507,000
Santa Maria Gas Co.	North Bank of Santa Maria River to Oilport	20	8	Under const. Cost, $225,000
Southern California Gas Co.	Arrowhead Springs-Lake Arrowhead	6+	4	Completed, 1931
Southern Counties Gas Co.	From Huntington Beach to Rose Canyon, near San Diego	68	12¾	Under const. Cost, $1,000,000
Southern Counties Gas Co.	At Ventura	.5	16	Completed, 1932 Cost, $16,000
Southern Counties Gas Co.	Santa Barbara to Ventura	30	16	Completed, 1931 Cost, $640,000
Southern Fuel Co.	Kettleman Hills to Long Beach	210	26	Completed, 1931 Cost, $6,500,000
*Manufactured gas transmission line (to be changed to natural).				
COLORADO				
Colorado Gas & Utilities Co.	Extension to Hartman	5+	2	Completed, 1931
Colorado Interstate Gas Co.	Main line to Colorado Springs	6	8	Completed, 1931 Cost, $50,000
Colorado Interstate Gas Co.	Main line to Portland	28	8	Completed, 1931 Cost, $500,000
Colorado Interstate Gas Co.	From La Junta line to Ordway, Sugar City, Fowler and Manzanola	31	6	Completed, 1931
Colorado-Wyoming Gas Co.	Main line to Longmont	1	3	Completed, 1931 Cost, $4,500
Colorado-Wyoming Gas Co.	Main line to Brighton and Fort Lupton	24	2½	Completed, 1931 Cost, $70,000
Rocky Mountain Gas Co.	Gas fields to Craig	3.5	..	Under const.
ILLINOIS				
Central Illinois Electric & Gas Co.	From Rockford-Freeport line to to Pecatonica	1.5	3	Completed, 1931
Central Illinois Public Service Co.	Cuba to Macomb	27	4	Completed, 1931
Illinois Northern Utilities Co.	Dixon to Polo, Mt. Morris and Oregon	25	4 3	Completed, 1932
Illinois Northern Utilities Co.	Wells near Maytown to Amboy	9	..	Proposed
Illinois Northern Utilities Co.	Main Chicago 24-inch line to Mendota	10	3	Under const.
Panhandle Illinois Pipe Line Co.	Hannibal, Mo. to Quincy, Ill.	25	10	Under const.

in Iowa, Illinois and Wisconsin, and other companies contracting for a supply of natural gas from the big line will construct several hundred miles of extensions. Included in these will be lines to Rockford, Freeport, Waukegan, Sterling, Galesburg, Monmouth, Ill., and Madison, Janesville, Burlington, Racine and Kenosha, Wis., and Cedar Rapids, Fairfield, Clinton, Ottumwa and Shenandoah, Iowa. The company has also recently announced plans for an 80-mile lateral north to Waterloo, Iowa, and another south to Keokuk, near the Iowa-Illinois state line.

Panhandle Eastern's Program

Panhandle Eastern Pipe Line Co., operating out of Kansas City brought to a successful conclusion its main line construction program as announced last year, with completion of a 24-inch line from Liberal, Kan., to Rockville, Ind., a distance of 850 miles, and two compressor plants of 5,000 and 4,000 B.h.p. capacity. At Rockville the line was met with Columbia Gas & Electric Corp.'s main line from Muncie, tying the Panhandle Eastern line into Ohio Fuel Gas Co.'s carrier from the east. Missouri Kansas Pipe Line Co., affiliate of Panhandle Eastern, also brought a line up from the Russellville fields of Kentucky, more than 150 miles distant. This line is of 10- and 12-inch pipe and will tie in with the Panhandle Eastern line at Rockville.

Main line and lateral construction by Panhandle Eastern changed the map of gas transmission lines in Illinois in no small degree, with a 60-mile carrier taking the new fuel to Peoria and numerous other shorter lines adding to the growing totals. With completion of these extensions, manufactured gas in Springfield, Peoria, Champaign, Danville, Decatur and many other towns was mixed with natural gas from the fields of Kansas and Texas.

At the point where Panhandle Eastern's main line ties in with the Columbia Gas & Electric Corp.'s system, a new line is scheduled to take off, extending in a north-easterly direction, serving the Detroit market and several other cities and towns enroute. There is some possibility that the line may take off from Columbia's line into Muncie. This line as now projected will be 200 miles long, of 20-inch pipe, and will cost in the neighborhood of five or six million dollars. It is reported that United Light & Power Co., parent of the Detroit City Gas Co., now distributing manufactured gas in Detroit, will participate in the construction program.

The Eastern Picture

In addition to the 100-mile line constructed by Columbia interests to tie in

Sketch showing United Gas Co. system in Mississippi, Louisiana and Texas—Copyright 1932, Western Gas.

its system with the Panhandle Eastern Pipe Line Co.'s Texas-Indiana carrier, the company has brought to completion two other major projects during the year, adding in an important way to the natural gas system of the east. A 90-mile line was built out of the Tioga field in northern Pennsylvania and southern New York to a point 10-miles from Syracuse, N. Y. Cost of this line was approximately $2,750,000. The most outstanding development sponsored by Columbia interests during the year was the construction of a 357-mile, 20-inch line from Kentucky fields to Coatesville, Pa., with an additional 100 miles of laterals. This line, reported to have cost in the neighborhood of $45,000,000, has the distinction of taking natural gas to the nation's capital city, where Washington Gas Light Co. and Georgetown Gas Light Co. serve mixed gas to approximately 118,242 meters. Source of the supply comes from fields in eastern Kentucky and the carrier extends into five states in addition to the District of Columbia. Probably no other gas line penetrates such historic territory as this one, crossing the Alleghenies into Virginia, through the lower end of the Shenandoah Valley, through Waynesboro, across the Potomac and north to Coatesville. The names of towns along the route of the line recall bloody chapters in the country's earlier history,—Bull Run, Manassas, Rapidan, Rapahannock, Quantico and Charlottesville.

Gas from Kentucky fields, reaching out eastward through Columbia's line and northward through the mains of the Missouri Kansas Pipe Line Co., was also taken by the latter company to serve several Kentucky cities and towns. Extending eastward from the Russellville

GAS TRANSMISSION LINE CONSTRUCTION 1931-1932

Company	Line Location	Length (Miles)	Size (Inches)	Status
ILLINOIS—Continued				
Panhandle Illinois Pipe Line Co.	Main line to Peoria	60	..	Completed, 1932
Panhandle Illinois Pipe Line Co.	Main line to Jackson	15	..	Completed, 1932
Panhandle Illinois Pipe Line Co.	Main line to Champaign	22	..	Completed. 1932
Panhandle Illinois Pipe Line Co.	Main line to Danville	25	..	Completed, 1932
Panhandle Illinois Pipe Line Co.	Peoria Line to Elmwood and Yates City	25	4	Completed, 1932
Panhandle Illinois Pipe Line Co.	Peoria line to Lincoln	15	..	Proposed
Panhandle Illinois Pipe Line Co.	Main line to Roodhouse, Carrollton and Jerseyville	30	..	Proposed
Panhandle Illinois Pipe Line Co.	Danville to Hoopeston	25	..	Proposed
Illinois Power & Light Corp	Texas-Chicago Main line to Galesburg Monmouth, Galva and Kewanee	75	..	Proposed
Laterals from Geneseo-Milwaukee extension of Natural Gas Pipeline Co. of America, to be constructed by other companies	From main line to Rockford From main line to Sterling From main line to Dixon From main line to Waukegan From main line to Sycamore	12 5— 5— 30 15+	.. ..	Proposed Proposed Proposed Proposed Proposed
IOWA				
Central States Electric Co.	Texas-Chicago line to Knoxville	2	..	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Glenwood	2	3	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Carson	1	3	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Oakland	1	2	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Avoca	12 3	4 2	Completed, 1931 Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Walnut	3	2	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Audubon	12	4	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Jefferson	4 5	3 4	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Des Moines	36	16	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Boxholm	3	2	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Dayton	1	2	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Fort Dodge	4	8	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Belmond	3	4	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Britt	6 7	4 6	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Garner	2	2	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Mason City	13	10	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Lake City	34	4	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Harcourt	2	2	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Manson	16	4	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Rockwell City	4	4	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Forest City	10	..	Proposed
Natural Gas Pipeline Co. of America	Texas-Chicago line to Newton, Grinnel, Marshalltown, Waterloo	80	..	Proposed
Natural Gas Pipeline Co. of America	Texas-Chicago line to Burlington, Fort Madison and Keokuk	75	..	Proposed
Laterals from Texas-Chicago main line, constructed by companies other than Natural Gas Pipeline Co. of America	Main line to Cedar Rapids Main line to Fairfield Main line to Clinton Main line to Shenandoah Main line to Winterset Main line to Indianola Main line to Ottumwa	40 25 30 20 10 8 22	.. ..	Proposed Proposed Proposed Proposed Completed, 1931 Completed, 1931 Proposed
KANSAS				
Argus Pipe Line Co.	Dodge City—power plant	5	..	Completed, 1932
Cities Service Gas Co.	Gathering lines in Welborn field, Wyandotte county.	8.2 3.2	4 2	Completed, 1931 Cost, $20,500
J. J. Griffiths	Field to Moran	3	..	Completed, 1932
Home Gas Co.	Loomis gas field to Council Grove	5	..	Completed, 1931
Home Gas Co.	Replacements	10	..	Completed, 1931

fields the company constructed a 60-mile carrier to serve Franklin, Bowling Green, Oakland, Rocky Hill, Mumfordville and Center. The company has also contracted with the Nashville Gas & Heating Co. to supply its system of 15,819 meters with natural gas from Russellville fields. This 50-mile, 8-inch line south to Nashville was scheduled to get under way sometime during the spring or summer months with completion planned for the winter load.

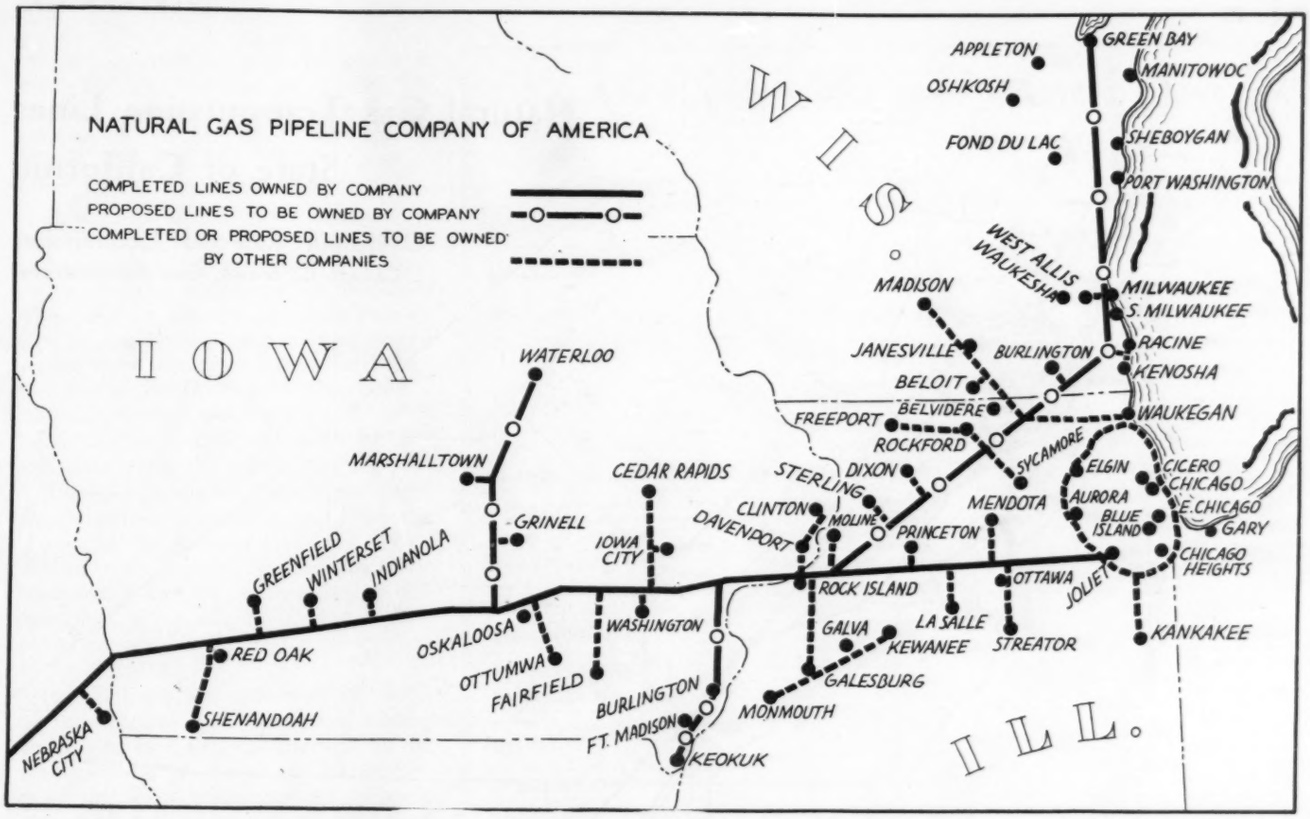
Nashville will be the second major Tennessee city to be supplied with natural gas, and the first to be served from Kentucky fields. Memphis has had natural from Louisiana fields for several years, and the Memphis Natural Gas Co., builder of the Monroe-Memphis carrier, extended service to Ripley, Jackson, Humboldt and Dyersburg, all served by West Tennessee Power & Light Co., during the year. The extension represented over 100 miles of transmission line construction.

United's Major Program

Gas from the Monroe field in northern Louisiana is also routed through Louisiana into Texas, south to the Kirbyville compressor station and into southern Louisiana to serve cities and towns in the Gulf region as a part of United Gas Co.'s $20,000,000 expansion program. This company's construction activities brought natural gas service to an average of one town each week during 1931 in the Texas-Louisiana territory and included several projects which were planned to provide additional service for the existing domestic and industrial load, and to service oil fields in north eastern Texas for drilling.

While the major portion of the work of the organization was centered in Texas and Louisiana, the year also marked the entry of the United Gas Public Service Co., operating subsidiary of United Gas System, into the state of Mississippi, with headquarters in Jackson, Miss., where large natural gas production was discovered during the year. During 1931 the United Gas organization took over full operation of the line extending from Jackson, southeastward to Pensacola, Fla., taking Louisiana gas to an Atlantic seaboard state for the first time.

United's largest construction project of the year was the Texas-Louisiana line, whereby 31 cities and towns of southern Louisiana were served. The main line extends from Kirbyville, Texas, to Franklin, La., and necessitated the laying of 45 miles of 14-inch, 16 miles of 12-inch, 54 miles of 10-inch, 30 miles of 8-inch and 11 miles of 6-inch pipe, a total of nearly 160 miles of main line construction. Lateral lines accounted for



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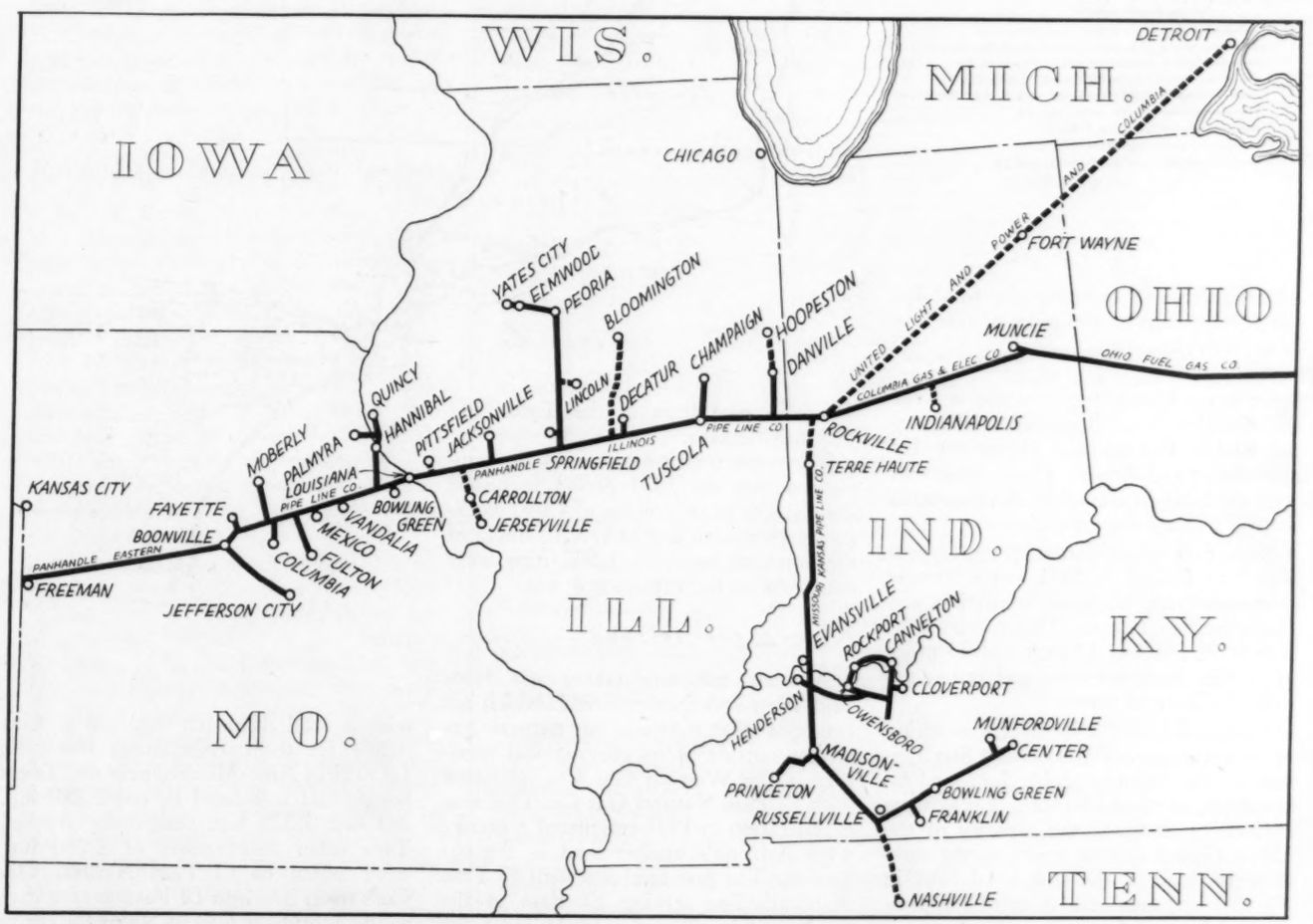


Sketch of the newly completed tie-in of Panhandle Eastern Pipe Line Co., with Columbia Gas & Electric Corp. and Missouri Kansas Pipe Line Co., at Rockville, Ind. Route of the line now projected by Columbia interests and the United Light & Power Corp. from Rockville to Detroit, is also shown. Copyright 1932, Western Gas.

240 more miles, bringing the total for the development to 400 miles of line laid in southern Louisiana.

Another completion of major importance by the United organization was the 92-mile line from Bogalusa to Covington, Slidell, Ponchatoula, Hammond, Independence and Amite. The coming year will probably see further developments in that area by the company.

The first construction project completed by United in 1931 was a 96-mile extension from Buda to Smithville and Hallettsville, Texas. This carrier consists of 22 miles of 12-inch and 74 miles of smaller diameter pipe, and serves gas to half a score of towns.

Interconnection and the construction of new compressor stations at Sterlington in the Monroe field, La., and at Goodrich, north of Houston, Texas, have materially increased the capacity of the entire United system, enabling the company to take on the additional load in Texas and Louisiana. A third compressor station at Longview, Texas, was completed in January, 1932. It is located strategically at the junction of the main pipe lines to the Tyler and Jacksonville area.

The construction program of the company during the 1931 period furnished employment to an average of 1,000 workmen each month and at certain stages of the work as many as 1,500 men were employed on the various projects.

Natural for Arizona

Another company taking gas from Mid-West and Southern fields which has extended the frontiers of natural gas service outside of its geographical territory is the Western Gas Co., affiliated with El Paso Natural Gas Co. This new organization in 1931 completed a carrier with Arizona's smelter load as the objective. The line connects with El Paso Natural's line serving El Paso at the Ascarate take-off and extends 218 miles to Douglas, Ariz., from there to Warren and Bisbee, Ariz., and Cananea, Mexico, with a total of nearly 300 miles. Gas supply for the carrier comes from the Jal field in New Mexico, near the Texas border and is boosted by one 2,280 h.p. and one 1,520 h.p. compressor station. Two other compressors of 2,280 h.p. were added to El Paso Natural Gas Co.'s main line into El Paso to take care of the additional load. Cost of the entire construction program was approximately $6,000,000. Besides supplying the smelt-

ers of the mining territory which it traverses, the line carries natural for domestic consumption to the distributing systems of the Arizona Edison Co. at Bisbee, Douglas and Warren, and to other population centers.

In addition to the major construction activities originating in the Middle West and reaching out toward eastern or western markets, several states of the Mid-West district showed a healthy gain in pipe line totals and new markets served within their own boundaries. In Texas, the Texas Public Service Co. built a 120-mile carrier from the Big Lake fields north to San Angelo and south to Girvin, completing the job in record time.

Several projects have been announced for the coming year which will bring the Texas totals up materially by 1933. Among these are the 50-mile line to be constructed by the Independent Engineering Co. to Memphis, and a line projected by United Gas Co. from Austin to Wichita Falls.

In Oklahoma, approximately 300 miles of transmission lines were laid, adding about a score of new communities to the list of natural gas towns and taking care of normal growth in territory previously served. A detailed story of the history of Oklahoma's gas development is given by E. F. McKay, manager of the Oklahoma Utilities Association, on page 32 of this issue, accompanied by a recent map of the gas transmission lines of the state.

Reconditioning for Gas Service

In the Kansas-Nebraska area, probably the most significant activity in addition to the work of the Northern Gas and Pipe Line Co. was the reconditioning of the Stanolind oil line extending from Welch, Wyo., across Nebraska and part of Kansas to Freeman, Mo., for use as a natural gas carrier. The reconditioned line is of 12- and 10-inch pipe, and was placed in service during 1931. This work added approximately 700 miles of line to fast growing totals and pioneered the western Nebraska territory for natural gas.

Two companies were identified with this development. The Kansas Pipe Line & Gas Co. of Salina, Kan., leased approximately 300 miles of line between Keystone, Neb., and Freeman, Mo. Gas from the Kansas lines of the company is now sent through this carrier to 10 towns in Nebraska and 13 in Kansas. Kansas Pipe Line also completed two compressor stations and several miles of transmission line in 1931 in addition to the reconditioning work.

North Central Gas Co., Casper, Wyo., organized during the early months of 1931 for development of the eastern Wyoming and western Nebraska market,

(Continued on Page 72)

GAS TRANSMISSION LINE CONSTRUCTION 1931-1932

Company	Line Location	Length (Miles)	Size (Inches)	Status
KANSAS—Continued				
Glen W. Leighty	Fields in Belleville township to Cedar Vale	..	..	Completed, 1932
Fred Garrison & Associates	Wells to Parsons (additional supply)	14	..	Completed, 1932
Kansas Pipe Line & Gas Co.	Reconditioned oil line leased from Standard of Indiana	115.5 44 35.2	12 10 8	In service, 1931
Kansas Pipe Line & Gas Co.	Stanolind line to Valley Falls Junction	16.9	8	Completed, 1932
Kansas Pipe Line & Gas Co.	Stanolind line to Topeka	5.7	8	Completed, 1931
Kansas Pipe Line & Gas Co.	Topeka-Van Buren plant	2.4	8	Completed, 1931
Kansas Pipe Line & Gas Co.	Valley Falls line	4.3	4	Completed, 1932
Kansas Pipe Line & Gas Co.	Stanolind line to Greenleaf	2.3	3	Completed, 1931
Kansas Pipe Line & Gas Co.	Greenleaf line to Linn	.5 6	3 2	Completed, 1931
Kansas Pipe Line & Gas Co.	Stanolind line to Morrowville	1.6	2	Completed, 1931
Kansas Pipe Line & Gas Co.	Stanolind line to Barnes	.3	2	Completed, 1931
Kansas Pipe Line & Gas Co.	Stanolind line to Mahaska	1.4	2	Completed, 1931
Kansas Pipe Line & Gas Co.	Stanolind line to Wheaton	3	2	Completed, 1931
Kansas Pipe Line & Gas Co.	Stanolind line to Haddam	4.3	2	Completed, 1931
Kansas Pipe Line & Gas Co.	Stanolind line to Lecompton	1.5	2	Completed, 1932
Kansas Pipe Line & Gas Co.	Lecompton line to Perry	2.3	2	Completed, 1932
Kansas Pipe Line & Gas Co.	Stanolind line to Westmoreland	5.9	2	Completed, 1931
Kansas Pipe Line & Gas Co.	Stanolind line to Blaine	.4	2	Completed, 1931
Kansas Pipe Line & Gas Co.	Stanolind line to Delia	2.5	2	Completed, 1931
Kansas Pipe Line & Gas Co.	Stanolind line to Hoyt	5	2	Completed, 1931
Kansas Pipe Line & Gas Co.	Stanolind line to Grantville	1.2	2	Completed, 1932
Kansas Pipe Line & Gas Co.	Stanolind line to Emmett	1.7	2	Completed, 1931
Kansas Power and Light Co.	Belleville 6-inch line to Scandia	8.5	2	Completed, 1931
Kansas Power and Light Co.	Rossville line to Silver Lake	5.35	2	Completed, 1931
Kansas Power and Light Co.	St. Mary's line to Rossville	7.6	3	Completed, 1931
Kansas Power and Light Co.	Main 16-inch line to Fort Riley	22	10	Completed, 1931
Marion County Pipe Line Co.	Sec. 21-19-5 Chase Co. to Florence	16	2, 4	Completed, 1931
Mid States Pipe Line Co.	Fields in Elk and Chautauqua counties to Neal	30	6	Completed, 1931
Kansas Power and Light Co.	Northern Gas and Pipe Line Co., 26-inch line to Miltonvale	1.5	2	Completed, 1931
Kansas Power and Light Co.	Northern Gas and Pipe Line Co. 26-inch line to Delphos	6.8	2	Completed, 1931
Kansas Power and Light Co.	Northern Gas and Pipe Line Co. 26-inch line to Beverly	3.5	2	Completed, 1932
Kansas Power and Light Co.	Northern Gas and Pipe Line Co. 26-inch line to Belpre	1.5	2	Completed, 1932
Kansas Power and Light Co.	Northern Gas and Pipe Line Co. 26-inch line to Holyrood	5	2	Completed, 1932
Kansas Power and Light Co.	Northern Gas and Pipe Line Co. 26-inch line to Claflin	7.2	2	Completed, 1932
Kansas Power and Light Co.	Northern Gas and Pipe Line Co. 26-inch line to Bushton	1.3	2	Completed, 1932
Kansas Power and Light Co.	Northern Gas and Pipe Line Co. 26-inch line to Macksville	3.1	2	Completed, 1931
United Gas & Pipe Line Co.	From Abilene to Solomon	9	4	Completed, 1932 Cost, $15,000
Veeder Supply and Development Co.	Main line to Altamont	6	6	Completed, 1932
LOUISIANA				
Southern Gas Line Inc.	Urania to Antonio	20	12¾	Completed, 1931 Cost, $225,000
United Gas Public Service Co.	Main line to De Ridder and Merryville	29.7	3	Completed, 1931

(Continued on Page 72)

Natural Gas Adds 500 *Towns* *in* 1931 Outreach

FRONTIERS of natural gas service area were pushed still farther from the center of production activity during 1931, with Florida, Virginia, Minnesota and Arizona added to the list of natural gas consuming states, and with the eastern section of South Dakota and western Nebraska also opened up for natural gas distribution.

Reviewing figures compiled from the following tables, as given by companies participating in this annual *Western Gas* survey, 370 communities with a combined population of 508,874 received gas for the first time in 1931, and 1,142,715 meters in 130 towns previously served manufactured were changed over to natural or mixed natural and manufactured gas. The year 1932 has already brought 44 towns with a population of 39,453 under the natural gas banner, and 19 towns with combined meters of 91,818 have been changed over to natural, as of April 1.

On the basis of gas franchises now granted, 66 cities and towns with a combined population of 111,550 will be served with gas before the end of 1932, and 69 towns with approximately 740,000 consumers will be changed over during the same period, if gas transmission line expansion follows its present schedule. Developments to be brought to light during the balance of the year will increase these totals measureably.

In addition to new natural gas communities, 83 towns were recruited by the liquefied petroleum gas branch of the industry with the completion during 1931 and to date in 1932 of approximately 80 central plants and distribution systems. This type of service reached communities with a combined population of 254,206, equal in domestic consumer demand to a city the size of Dallas, Texas, or St. Paul, Minn.

With a total of approximately 4,700 miles of gas transmission line construction already planned for the coming months, the year 1932 will undoubtedly close with the industry adding towns and cities in virgin territory such as eastern North Dakota, western Minnesota, Wisconsin, and Washington, and extending service to many communities already within the boundaries of natural gas territory.

Service Begun in 1931

Company Town	Population
CALIFORNIA	
Coast Counties Gas and Electric Co.	
Clyde	80
Danville	750
Diablo	75
Pacific Gas and Electric Co.	
Woodbridge	250
Spreckles	450
Escalon	700
***San Diego Consolidated Gas & Electric Co.**	
Otay	500
San Ysidro	1,600
Del Mar	200
Solano Beach, Cardiff, Encinitas, Leucadia, Carlsbad	2,000
Southern California Gas Co.	
Arrowhead	300
Chatsworth	800
COLORADO	
Colorado Gas & Utilities Co.	
Vilas	40
Hartman	175
Public Service Co. of Colorado	
Longmont	6,025
Aurora	2,259
Brighton	3,390
Fort Lupton	1,559
ILLINOIS	
***Central Illinois Public Service Co.**	
Effingham	3,961
Havana	3,445
Lewiston	2,249
Siegel	292
Neoga	992
***Central Illinois Electric & Gas Co.**	
Pecatonica	1,152
Public Service Co. of Northern Illinois	
Beverly	115
Forest View	125
Olympia Fields	143
IOWA	
Central States Electric Co.	
Belmond	1,733
Britt	1,593
Garner	1,241
Fort Dodge Gas & Electric Co.	
Manson	1,382
Iowa Electric Co.	
Anita	1,300
Casey	1,000
Wiota	...
Iowa Gas Distributing Co.	
Ogden	1,429
Dayton	713
Harcourt	264
Gowrie	1,059
Lehigh	996
Pilot Mound	274
Glenwood	4,269
Farnhamville	365
Boxholm	280
Iowa Nebraska Light & Power Co.	
Avoca	1,673
Carson	617
Walnut	935
Oakland	1,181
Iowa Power & Light Co.	
Indianola	3,488
Winterset	2,921
Iowa Public Service Co.	
Lake City	2,012
Audubon	2,255
Rockwell City	2,108
Exira	937
Lohrville	776
Iowa Railway & Light Corp.	
Greenfield	1,837
Garner	1,241
Northwestern Light and Power Co.	
Alta	1,195
Aurelia	677
Peoples Gas & Electric Co.	
Clear Lake	3,066
KANSAS	
Bourbon County Pipe Line Co.	
Fulton	393
Mapleton	251
American Gas Co.	
Waverly	593
Hartford	516
Baxter Springs Gas Co.	
Treece	749
Cedar Vale Gas Co.	
Cedar Vale	1,000
Central States Gas Utilities Co.	
Arlington	501
Burns	455
Bloom	554
Elbing	110
Iuka	185
Kismet	160
Kingsdown	113
Langdon	181
Mullinville	436
Preston	383
White Water	556
Minneola	617
Turon	576
Bucklin	817
Union Public Service Co.	
Vesper	407
Whiting	351
Kansas Gas and Fuel Co.	
Mildred	341
Kincaid	380
Home Gas Co.	
Council Grove	2,898
Kansas Pipe Line & Gas Co.	
Barnes	361
Blaine	118
Delia	269
Emmett	268
Greenleaf	660
Haddam	381
Hoyt	228
Linn	340
Mahaska	218
Morrowville	246
Narka	252
Westmoreland	501
Wheaton	170
Kansas Power and Light Co.	
Axtell	607
Baileyville	138
Beattie	434
Belvue	186
Blue Rapids	1,465
Delphos	678
Frankfort	1,346
Greensburg	1,338
St. John	1,552
Stafford	1,614
Home City	218
Irving	356
Marquette	714
Rossville	701
St. George	216
St. Mary's	1,304
Scandia	608
Seneca	1,864
Silver Lake	336
Louisburg Gas Co.	
Lacygne	1,019
Strong City Gas Co.	
Florence	1,400
Cedar Point	500
Hillsboro	2,200
United Gas & Pipe Line Co.	
Solomon	1,032
Union Public Service Co.	
Geneseo	536
Montrose	131
Sylvan Grove	530
United Gas Service Co.	
Thayer	495
Glasco	500
Walnut Gas Co.	
Quincy	216
KENTUCKY	
Consolidated Utilities Co.	
Lebanon	3,248
Central Gas Corp.	
Providence	4,742
Sturgis	2,154
Indiana-Kentucky Natural Gas Corp.	
Princeton	3,688
LOUISIANA	
Louisiana Power & Light Co.	
Hammond	6,072
Amite	2,536
Covington	3,208
Ponchatoula	2,898
Slidell	2,807
Independence	1,700
United Gas Public Service Co.	
Westlake	670
Sulphur	1,888
De Quincy	3,589
Rayne	3,710
Vinton	1,989
St. Martinville	2,455
Broussard	806
De Ridder	3,747
Welsh	1,514
Jennings	4,035
Crowley	7,656
Erath	895
Churchpoint	1,037
Le Compte	1,247
Merryville	2,626
Youngsville	536
Marksville	1,527
Abbeville	4,356
Elton	742
Oberlin	900
Opelousas	6,299
Franklin	3,271
Jeanerette	2,228
New Iberia	8,003
Kinder	962
Bunkie	2,464
Oakdale	3,188
Cottonport	1,015
Mansura	1,067
Cheneyville	1,200
MISSISSIPPI	
Mississippi Power & Light Co.	
Benton	261
Leland	2,426
Mississippi Public Service Co.	
Aberdeen	3,925
MISSOURI	
Bowling Green Gas Co.	
Bowling Green	1,855

* Manufactured gas.

Company Town	Population
Bourdon Pipe Line Co.	
Rich Hill	2,118
Hume	595
Central States Gas Utilities Co.	
Tipton	1,200
Houstonia	500
Pilot Grove	800
Clarksburg	500
Centerview	300
Meadville	709
Green Ridge	358
Missouri Power & Light Co.	
Centralia	2,009
Farber	436
Hallsville	212
Laddonia	576
New Franklin	1,210
New London	900
Sturgeon	600
Ozark Distributing Co.	
Alma	361
Blackburn	292
Carrollton	4,058
Concordia	1,140
Emma	167
Knob Noster	683
LaMonte	515
Norborne	1,190
Sweet Springs	1,641
Waverly	941
General Utilities Co.	
Smithville	800
Plattsburg Gas & Service Co.	
Plattsburg	1,672
Western Service Corp.	
Butler	2,706
Adrian	934
El Dorado Springs	1,917
Appleton City	1,136
Deepwater	1,093
Amoret	334
Montrose	531
Missouri Natural Gas Co.	
Desloge	2,568
Flat River	771
Bonne Terre	4,021
Elvins	2,403
MONTANA	
Montana Power Co.	
Absarokee	265
Anaconda	12,494
Big Timber	1,259
Bozeman	7,896
Columbus	849
Deer Lodge	3,785
East Helena	1,139
Livingston	6,883
Red Lodge	3,026
Roberts	395
Walkerville	2,052
Wolf Creek	115
MINNESOTA	
Minnesota Northern Natural Gas Co.	
Alden	532
NEBRASKA	
Central States Electric Co.	
Winnebago	653
Walthill	1,162
Lyons	985
Rosalie	279
Homer	452
Elkhorn Valley Power Co.	
Scribner	1,066
Hooper	985
Iowa Nebraska Light & Power Co.	
Oakland	1,433
Arlington	622
Craig	452
Tekamah	1,804
West Point	2,223
Adams	535
Firth	322
North Central Gas Co.	
Broadwater	368
Lisco	843
Morrill	772
Henry	129
Mitchell	2,055
Minatare	1,080
Bayard	1,559
Northport	110
Bridgeport	1,362
Lewellen	419
Kansas Pipe Line & Gas Co.	
Brady	387
Keystone	162
Maxwell	409
Ogallala	1,631
Peoples Natural Gas Co.	
Auburn	3,068
Humboldt	1,435
Johnson	288
Pawnee City	1,573
Sterling	702
Tecumseh	1,829
Blue Springs	700
Wymore	2,680
Ashland	1,796
Elmwood	515
Louisville	969
Palmyra	344
Weeping Water	1,029
Elkhorn	411
Waterloo	432
Valley	1,039
Wayne	2,381
Bancroft	660
Emerson	891
Wakefield	1,112
Pender	1,006
Dakota City	417
NEW MEXICO	
Southern Union Gas Co.	
Bernalillo	840
OKLAHOMA	
Cimarron Utilities Co.	
Boise City	1,600
Choteau Gas Co.	
Choteau	430
Pryor	1,828
T. B. Clayton	
Canute	366
Bowlegs Gas Co.	
Bowlegs	1,500
Capital Gas Co.	
So. Capital Hill	Suburb
Junior Gas Co.	
Howe	692
Heavener	2,269
Mulhall Gas Co.	
Mulhall	374
Newcomb Gas Co. (H.G.)	
Indianola	378
Oklahoma Natural Gas Corp.	
Porum	500
Oklahoma Utilities Co.	
Vian	1,000
Pact Gas Co.	
Coyle	421
Langston	351
Carney	328
Phillips Kay County Gas Co.	
Webb City	493
Public Service Corp. of Texas	
Supply	230
Spiro Gas Co.	
Red Oak	
State Fuel Supply Co.	
Buffalo	990
Laverne	960
Southwestern States Gas Co.	
Moffett	200
Arkoma	250
Western Service Corp.	
Guthrie	9,582
Jones	288
Spencer	180
Wilson Brothers Gas Co.	
Haskell	2,632
OREGON	
***Portland Gas & Coke Co.**	
Sherwood	1,300
Middleton	51
Newberg	2,949
Rex	50

* Manufactured gas.

Company Town	Population
TENNESSEE	
West Tennessee Power & Light Co.	
Ripley	3,000
Covington	4,500
Henning	1,000
Brownsville	4,000
Humboldt	4,500
TEXAS	
Houston Pipe Line Co.	
Skidmore	1,217
E. P. Moseley	
Port Lavaca	1,367
Panhandle Power & Light Co.	
Gruvet	600
Stratford	1,000
Kerrick	25
Etter	15
Rio Grande Valley Gas Co.	
Elsa	100
Raymondville	2,500
Santa Anna Gas Co.	
Coleman	6,078
Texas Gas Utilities Co.	
Uvalde	5,286
La Pryor	415
United Gas Public Service Co.	
Huntsville	5,028
Groveton	1,046
Trinity	2,036
Odem	842
Shepherd	450
Riverside	300
Orange Grove	1,000
Saratoga	500
Smithville	3,296
La Grange	2,354
Buda	320
Weimar	1,256
Teneha	591
Schulenburg	1,604
Halletsville	1,450
Joaquin	407
Arp	1,000
Willow Spring	500
Gladewater	3,000
Corrigan	600
Kilgore	10,000
West Texas Gas Co.	
Petersburg	548
Seagraves	505
Seminole	500
UTAH	
Wasatch Gas Co.	
American Fork	3,037
Lehi	3,078
Pleasant Grove	1,753
WASHINGTON	
***Seattle Gas Co.**	
Lake City	1,298
North Riverton	250
Duwamish	940
Riverton	655
Foster	603
Tuckwila	424
Renton Junction	100
Orilla	1,023
Kent	2,321
***Washington Gas & Electric Co.**	
Snohomish	2,985
***Western Gas Co. of Washington**	
Bremerton	10,170
WYOMING	
Frannie Gas Co.	
Frannie	32
North Central Gas Co.	
Douglas	1,914
Guernsey	656
Lingle	277
Torrington	1,811
Wheatland	1,997
Fort Laramie	245
Wyoming Gas Co.	
Meteetsee	

* Manufactured gas.

Service Begun 1932

Company Town	Population
CALIFORNIA	
Coast Counties Gas and Electric Co.	
Nichols	396
COLORADO	
Arkansas Valley Natural Gas Co.	
Sugar City	598
Ordway	1,139
Manzanola	578
Fowler	968
ILLINOIS	
Central Illinois Light Co.	
Farmington	2,269
Elmwood	212
Yates City	582
Company Town	**Population**
***Illinois Northern Utilities Co.**	
Oregon	2,376
Polo	1,871
Mt. Morris	1,902
KANSAS	
Kansas Power and Light Co.	
Beverly	328
Bushton	325
Claflin	607
Englewood	477
Grantville	219
Holyrood	432
Lecompton	288
Lorraine	177
Macksville	868
Miltonvale	814
Onaga	930
Oskaloosa	733
Ozawkie	100
Perry	418
Tescott	382
Valley Falls	1,238
Vining	198
KENTUCKY	
Carrollton Gas Co.	
Carrollton	2,409
LOUISIANA	
O. B. Siler	
Logansport	1,040
MINNESOTA	
Minnesota Northern Natural Gas Co.	
Wells	1,795
Dodge Center	854
Kasson	1,019
New Richland	777
MISSISSIPPI	
Southern Gas Utilities Inc.	
Clinton	912
MISSOURI	
Missouri Power & Light Co.	
Vandalia	2,450
Wellsville	1,525
Martinsburg	530
NEBRASKA	
Natural Gas Distributing Co.	
Red Cloud	1,519
OKLAHOMA	
Beggs Gas Service Co.	
Beggs	1,531
Stratford Gas Co.	
Stratford	950
TEXAS	
Texas Cities Gas Co.	
Fort Crockett	

* Manufactured gas.

Franchise Granted 1931-1932 (Service Not Yet Begun)

Company Town	Population
ARIZONA	
Central Arizona Light and Power Co.	
Glendale	2,800
ARKANSAS	
Arkansas Valley Gas Co.	
De Queen (extension)	2,938
CALIFORNIA	
Pacific Gas and Electric Co.	
Fowler	1,171
COLORADO	
Fred Haller	
Mancos	
Fulton Petroleum Co.	
Craig	1,418
Ohio Oil Co.	
Craig	1,418
ILLINOIS	
Central Illinois Public Service Co.	
Mason	328
Pittsfield	1,428
Carrollton	2,075
Jerseyville	4,309
Villa Grove	2,569
Tuscola	1,494
Virginia	1,494
IOWA	
Northern Gas and Pipe Line Co.	
Forest City	2,016
KANSAS	
Kansas City Industrial Fuel Gas Co.	
†Kansas City	
KENTUCKY	
Kentucky Public Service Co.	
Bardstown	1,717
MINNESOTA	
Minnesota Northern Natural Gas Co.	
Amboy	500
Byron	300
Janesville	1,275
Mantorville	400
Mapleton	900
Morristown	700
Belleplaine	1,251
Pipestone	3,489
Pine Island	1,000
St. Peterville	4,350
Waterville	1,250
Wells	1,900
West Concord	705
Zumbrota	1,300
MISSOURI	
Central States Gas Utilities Co.	
Laclede	700
Bevier	1,900
Callao	600
Palmyra	2,000
Gas Service Co.	
Parkville	636
C. D. Reynolds	
Cameron	3,507
MONTANA	
Montana Dakota Power Co.	
Kenmare	1,497
Hettinger	1,292
NEBRASKA	
Nebraska Natural Gas Co.	
Ord	2,226
St. Paul	1,621
Ravenna	1,800
Loup City	1,500
Bladen	500
Blue Hill	700
Campbell	600
Schuyler	2,588
North Central Gas Co.	
Lyman	656
Peoples Natural Gas Co.	
Madison	1,842
Norfolk	10,717
NEW MEXICO	
Southern Union Gas Co.	
Las Vegas	4,719
OKLAHOMA	
Braman Oil Co.	
Locust Grove	510
Boynton	1,204
Andy McInturff	
Hoffman	375
Liberal Gas Co.	
Haskell	1,682
Oklahoma Power & Water Co.	
Shidler	1,177
Pact Gas Co.	
Cushing	9,301
Spiro Gas Co.	
Spiro	969
Western Service Corp.	
Britton	2,214
Wash Whitlow	
Billings	658
SOUTH DAKOTA	
Sioux Falls Gas Co.	
Centerville	1,104
Harrisburg	400
Worthing	400
Lennox	900
WASHINGTON	
Northwestern Natural Gas Co.	
Kennewick (extension)	1,519
CANADA	
A. W. Bletcher	
Peace River, Alberta	980
Vegreville Utilities, Ltd.	
Vegreville	1,479

† Industrial franchise.

Natural Gas Change Over 1931

Company Town	Meters
ARIZONA	
Arizona Edison Co.	
Douglas	1,564
Bisbee, Lowell, Warren	1,893
CALIFORNIA	
San Joaquin Light & Power Corp.	
Merced	1,490
Madera	650
COLORADO	
City Power & Light Dept.	
Colorado Springs	5,067
ILLINOIS	
Illinois Power & Light Corp.	
Jacksonville	3,069
Peoples Gas Light and Coke Co.	
Chicago	904,279
****Public Service Co. of Northern Illinois**	
Antioch	220
Arlington Heights	1,344
Barrington	965
Bellwood	1,137
Berkeley	128
Berwyn	13,180
Blue Island	4,216
Broadview	240
Calumet Park	162
Chicago Heights	4,586
Chicago Ridge	37
Cicero	17,633
Crete	309
Des Plaines	2,385
Dixmoor	62
Dolton	641
East Hazel Crest	42
Elmwood Park	3,129
Evanston	18,039
Evergreen Park	307
Flossmoor	203
Forest Park	4,156
Fox Lake	639
Franklin Park	615
Glenview	723
Glenwood	92
Golf	32
Harvey	4,222
Hazel Crest	295
Hillside	194
Homewood	896
Justice	59
Kenilworth	592
Lake Villa	153
Lake Zurich	225
Lansing	544
Lyons	1,056
Markham	5
Matteson	130
Maywood	7,034
McCook	15
Melrose Park	2,461
Midlothian	423
Mokena	166
Morris	1,304
Morton Grove	455
Mt. Prospect	373
Niles	281
Niles Center	1,467
Northbrook	421
Northfield	110
North Riverside	170
Oak Lawn	452
Oak Park	18,527
Orland Park	93
Palatine	656
Palos Park	30
Park Ridge	3,038
Phoenix	386
Pontiac	1,731
Posen	219
Riverdale	587
River Forest	2,139
River Grove	755
Riverside	1,998
Round Lake	98
Schiller Park	212
South Chicago Heights	298
South Holland	431
Spring Forest	115
Steger	509
Stickney	344
Tessville	38
Thornton	242
Tinley Park	279
Wauconda	265
Westchester	124
Wheeling	157
Wilmette	3,799
Worth	56
****Western United Gas & Electric Company**	
Ava	124
Batavia	1,472
Bellmont	158
Bensenville	544
Benton	523
Buckner	96
Carbondale	1,255
Carterville	428
Crainville	...
Christopher	661
Du Quoin	1,017
Energy	21
Herrin	947
Johnson City	656
Marion	1,406
Murphysboro	1,262
West City	4
West Frankfort	1,765
IOWA	
Des Moines Gas Co.	
Des Moines	33,661
Fort Dodge Gas & Electric Co.	
Fort Dodge	4,331
Peoples Gas & Electric Co.	
Mason City	4,810
LOUISIANA	
Louisiana Public Utilities Co.	
Lafayette	894
United Gas Public Service Co.	
Lake Charles	1,817
MISSOURI	
Citizens Gas Co.	
Hannibal	3,410
Missouri Edison Co.	
Louisiana	498
Missouri Gas & Electric Service Co.	
Lexington	553
Missouri Power & Light Co.	
Boonville	736
Jefferson City	3,022
MONTANA	
Montana Power Co.	
Butte	1,918
Helena	1,630
NEBRASKA	
Central Power Co.	
Nebraska City	783
Grand Island	3,343
Fremont Gas Co.	
Fremont	1,705
Iowa-Nebraska Light & Power Corp.	
Blair	393
North Central Gas Co.	
Scottsbluff, Gering	666
Northwestern Public Service Co.	
North Platte	1,781
Peoples Natural Gas Co.	
Fairbury	1,312
SOUTH DAKOTA	
Sioux Falls Gas & Electric Co.	
Sioux Falls	7,467
TENNESSEE	
West Tennessee Power & Light Co.	
Jackson	1,783

** Mixed natural and manufactured gas.

Natural Gas Change Over 1932

Company Town	Meters
ILLINOIS	
Central Illinois Light Co.	
Peoria	25,037
East Peoria, Pekin, Peoria Heights	3,171
Illinois Power & Light Corp.	
Decatur	12,977
Danville	7,950
Champaign	5,685
Jacksonville	3,069
Urbana	3,510

Company Town	Population
Illinois Power Co.	
Springfield	16,214
Public Service Co. of Northern Illinois	
Marseilles	893
Kankakee	5,718
Momence	5
Bradley	163
St. Anne	9
Streator	3,412
Ottawa	3,512
IOWA	
Central States Electric Co.	
**Knoxville, Pella	493

** Mixed natural and manufactured gas.

Pending Change Over 1932

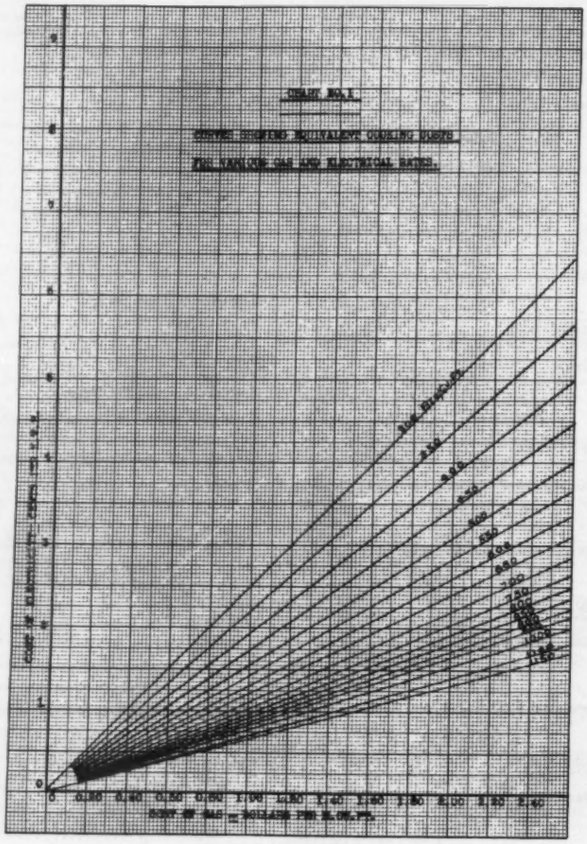
Company Town	Population
CALIFORNIA	
San Diego Consolidated Gas and Electric Co.	
San Diego, Chula Vista, La Jolla, Coronado, Pacific Beach, Ocean Beach, National City, San Ysidro, Oceanside	56,939
ILLINOIS	
Central Illinois Electric & Gas Co.	
Rockford	23,425
Freeport	5,970
Lincoln	1,374
Central Illinois Public Service Co.	
Canton	2,297
Cuba	...
Havana	169
McComb	1,767
Hoopeston	1,050
Shelbyville	515
Quincy	9,792
Taylorville	1,502
Kewanee Public Service Co.	
Kewanee	3,869
Illinois Northern Utilities Co.	
Belvidere	2,028
Polo, Dixon, Mt. Morris	2,567
Sycamore	1,121
Mendota	869
Sterling	2,432
Illinois Power and Light Co.	
Galesburg	7,387
Monmouth	1,979
Princeton Gas Co.	
Princeton	1,035
IOWA	
Cedar Rapids Gas Co.	
Cedar Rapids	13,839
Fort Madison Gas Light Co.	
Fort Madison	2,553
Iowa Electric Co.	
Fairfield	1,201
Iowa Public Service Co.	
Waterloo	11,331
Iowa Nebraska Light & Power	
Shenandoah	948
Iowa Railway and Light Corp.	
Marshalltown	3,794
Iowa Southern Utilities Co.	
Grinnell	812
Burlington	7,054
Keokuk Electric Co.	
Keokuk	2,813
Ottumwa Gas Co.	
Ottumwa	4,431
Peoples Light Co.	
Davenport	14,980
Sioux City Gas & Electric Co.	
Sioux City	18,369
MINNESOTA	
Interstate Power Co.	
Austin	2,498
Owatonna	1,414
Albert Lea	1,903
Rochester	3,107
MISSOURI	
Laclede Gas Light Co.	
St. Louis	196,605
Missouri Utilities Co.	
Columbia	2,115
Missouri Power & Light Co.	
Excelsior Springs	836
Moberly	2,515
St. Louis County Gas Co.	
Webster Groves	*38,510

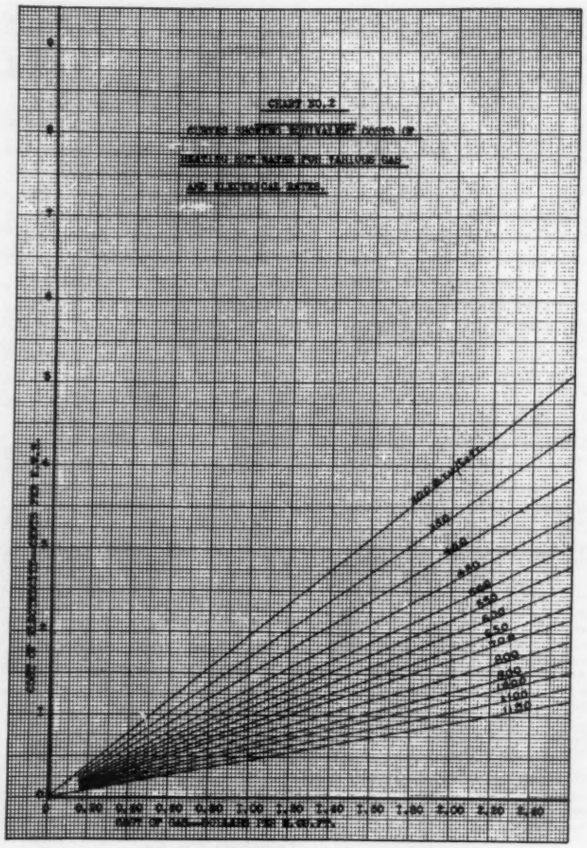
* Includes all towns served in St. Louis County.

Company Town	Population
NEBRASKA	
Central West Public Service Co.	
Columbus	1,264
TENNESSEE	
Nashville Gas & Heating Co.	
Nashville	15,819
WISCONSIN	
Lakeshore Gas Co.	
Whitefish Bay	1,046
Madison Gas & Electric Co.	
Madison	14,680
Milwaukee Gas Light Co.	
Milwaukee	143,076
Wauwatosa Gas Co.	
Wauwatosa	6,028
West Allis Gas Co.	
West Allis	8,850
Wisconsin Gas & Electric Co.	
Racine	47,871
Kenosha	11,408
Fort Atkinson	1,367
Watertown	2,478
Waukesha	3,871
Whitewater	445
Wisconsin Power & Light Co.	
Beloit	5,488
Janesville	4,397
Wisconsin Public Service Corp.	
Green Bay	8,058
Wisconsin Southern Gas Co.	
Burlington	2,916

Butane-Propane Plant Installations 1931-1932

Company Town	Population
ARIZONA	
Arizona Gas Co.	
Winslow	3,917
CALIFORNIA	
Natural Gas Corp. of California	
Arcata	1,709
Dunsmuir	2,610
Yreka	2,126
El Centro	8,434
City of Avalon Gas Dept.	
Avalon	1,897
Santa Maria Gas Co.	
Buellton	90
Solvang	425
Southwest Gas Corp.	
Barstow	2,700
Victorville	2,000
CANADA	
City Gas & Electric Co., Ltd.	
Three Rivers, Quebec	22,000
FLORIDA	
Florida Gas Co.	
Eustis, Mt. Dora, Umatilla	2,450
ILLINOIS	
Consclidated Utilities Corp.	
Flora (under construction)	4,393
Great Northern Utilities Co.	
Watseka	3,144
INDIANA	
Consolidated Utilities Corp.	
Mt. Vernon (under construction)	5,035
Indiana Utilities Corp.	
Corydon	2,000
IOWA	
Skelly Oil Co.	
De Witt	2,041
Animosa	3,579
KANSAS	
Western Gas & Utilities Co.	
Goodland	3,626
MAINE	
Aroostook Gas Co.	
Houlton	6,865
Central Maine Power Co.	
Brunswick	6,144
MARYLAND	
Eastern Shore Gas Co.	
Berlin	2,500
Ocean City (winter)	3,500
(summer)	50,000
Pocomoke City	3,000
Snow Hill	
MASSACHUSETTS	
Buzzards Bay Gas Co.	
Falmouth	4,821
Barstable County Gas Co.	
Hyannis	1,800
Simonds Saw & Steel Co.	
Fitchburg	40,692
MINNESOTA	
American Gas Construction Co.	
Hutchinson	3,401
Anoka	4,751
Northland Utilities	
Cloquet	6,000
Municipalities Gas Corp.	
Detroit Lakes	3,800
Pelican Rapids	1,365
Vergas	323
Frazee	1,041
Barnesville	1,279
Park Rapids	2,081
Callaway	230
Perham	1,411
Dent	224
Lake Park	624
Hawley	958
Hitterdahl	198
Wadena	2,512
Ulen	452
Staples	2,667
Mahnomen	989
New York Mills	667
Sebeka	548
Twin Valley	731
Henning	552
Ada	1,285
Two Harbors Gas Department	
Two Harbors	4,600
Northland Utilities Co.	
Cloquet	6,000
MISSOURI	
Mariclare Utilities Corp.	
Mountain Grove	2,150
NEVADA	
Nevada Gas Co.	
Las Vegas	3,000
NEW JERSEY	
Jersey Central Power & Light Co.	
Beach Haven	715
Suburban Gas Co.	
Belvidere	2,073
NEW YORK	
Central Hudson Gas & Electric Corp.	
Catskill	5,082
County Utilities Co.	
Fallsburg	4,716
Hudson Valley Gas Corp.	
Walden	5,000
Lowville Gas Co.	
Lowville	3,424
New York Power & Light Co.	
Canajoharie	3,500
Palatine Bridge	503
NORTH DAKOTA	
Wahpeton Gas Co.	
Wahpeton	3,500
NORTH CAROLINA	
Southern Public Utilities Co.	
Mt. Airy	6,045
OREGON	
Natural Gas Corp. of Oregon	
Bend	8,848
Coquille	2,732
Cottage Grove	2,473
Klamath Falls	16,093
La Grande	8,050
The Dalles	6,000
Lakeview Gas Co.	
Lakeview	2,000
SOUTH CAROLINA	
National Gas & Utilities Corp.	
Hartsville	5,067
TENNESSEE	
Chattanooga Gas Co.	
Fayetteville	3,822
VIRGINIA	
Eastern Shore Gas Co.	
Chincoteague	2,130
WASHINGTON	
Natural Gas Corp. of Wash.	
Anacortes	3,091
Camas	4,239
Port Angeles	10,188
Port Townsend	3,979
Shelton	3,091





Gas *and* Electricity

By
R. M. Conner

Some Essential Data on the Comparative Economics of These Domestic Servants

WHILE it is manifestly impossible to "stake off" the various fields of domestic service, allotting definite functions to gas and others to electricity, it is none the less true that basic economic considerations point the directions in which these competitors will logically expand. These competitive aspects are being pushed more and more into the foreground by national campaigns directed at the cooking load, and gas men will therefore welcome the authoritative array of facts which Mr. Conner presents in this article.
—*Editor.*

IT is recognized that city gas used for domestic heating purposes is meeting very definite competition from electricity in certain sections of the United States. This situation is particularly true in the Pacific Northwest and in several states adjacent to the Great Lakes where exceedingly low rates for electrical energy prevail. Granting therefore that this condition exists it is interesting to study the engineering and economic reasons for it with the hope that some general conclusions regarding the future may be drawn. No effort will be made to discuss purely commercial aspects of this competitive problem, as they are outside the scope of this paper.

A consideration of this whole subject involves so many collateral factors that it is impractical to attempt to cover them all in one paper. A fairly comprehensive review of it will be found in a report recently published by the A.G.A. Laboratory. This bulletin, however, does not go very far into the engineering aspects of the situation which it is desired to cover to a limited extent herein.

Electrical energy is generated commercially usually either by steam or hydro-electric power plants. The method employed depends largely on the available fuel supply or the proximity of a satisfactory hydro-electric power plant site. The ultimate cost of this commodity, therefore, is largely a function of local conditions, although the extensive interconnection of power lines practiced in recent years is gradually changing this picture. Statistics show, however, that gas faces its most serious competition in districts where electricity is generated on a large scale from hydro-electric power plants.

Granting that the above analysis is substantially correct, we may consider briefly the future of hydro-electric power. Some extremists go so far as to predict that eventually the American people will not only cook their meals and heat water with electricity but that this source of energy will supply their house heating requirements as well. The latter devel-

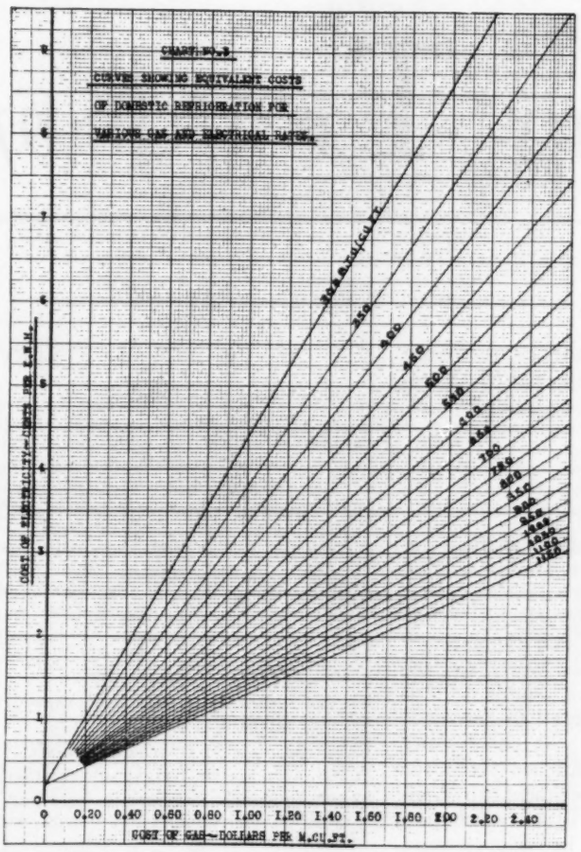
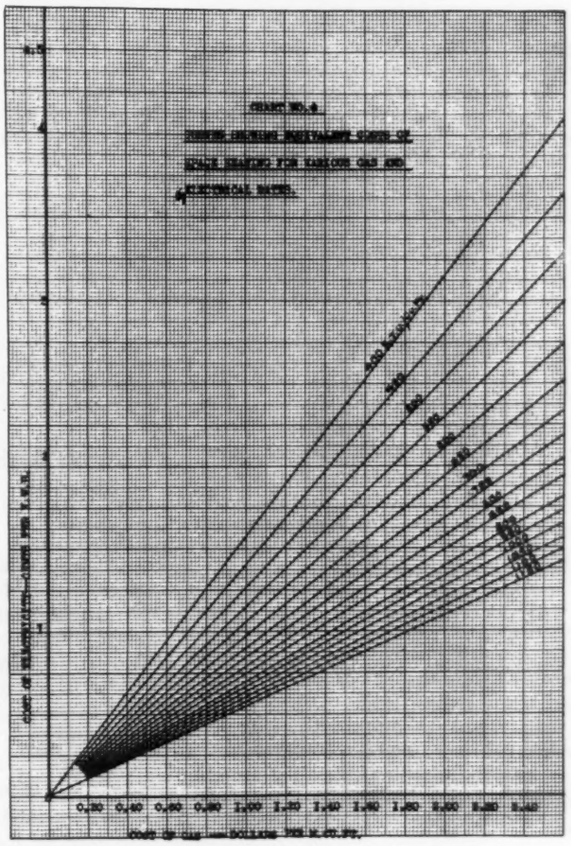


CHART No. 2
CURVES SHOWING EQUIVALENT COSTS
OF DOMESTIC REFRIGERATION FOR
VARYING GAS AND ELECTRICAL RATES
COST OF ELECTRICITY—CENTS PER K.W.H.
0 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.20 2.40
COST OF GAS—DOLLARS PER M.CU.FT.



opment is most improbable as it would call for about 45 times as much energy as is now being generated hydro-electrically and about three times as much as the ultimate generating capacity of all the usable streams in the United States which is roughly 580 x 10^9 Kwhs. (1)* Further analysis of this subject indicates that the average cost of hydro-electric power plants has increased from roughly $100 per Kwh. capacity in the early years of our country to from $300 to $500 in 1931. Furthermore electricity generated by hydro-electric plants now equals only about 33 per cent (2) of the total amount produced annually and this proportion is becoming smaller as new developments grow more costly and are located farther away from available markets. Consequently it seems that hydro-electric power, although now a keen competitor of gas for domestic heating purposes in certain districts, will gradually become of lesser importance from this standpoint as time goes on.

While marked advances have been made in the production of electrical energy by steam power plants, the average now being about 1.67 pounds of coal per Kwh. (1) it must be borne in mind that most plants of this nature operate at an overall efficiency of only about 20 per cent. (2) Furthermore, it is doubtful if any extensive use of electrical energy, particularly for house heating purposes, would prevail when the very fuels from which it is generated can be utilized considerably more efficiently in the home at a cost, in some instances, per unit of volume not materially greater. Considering transmission and distribution losses at 14.5 per cent (3) it is doubtful if 15 per cent of the original energy in the initial source of fuel supply would be effectively utilized in the heating of factories or homes with electricity.

Having very briefly discussed the electrical situation we might apply a similar yardstick to the future of gas. While it is known that enormous quantities of natural gas are wasted daily in some fields, it must also be conceded that it would not be economically feasible to attempt to utilize all of it at the present time. As this fuel is often delivered to customers through long and expensive transmission lines and distribution systems it must be sold at a price that will render the utility a fair return, and within a reasonable length of time amortize the original investment. Notwithstanding these facts, however, we find that natural gas can be and is being delivered from fields to centers of distribution as far distant as a thousand miles and is being sold at a cost per B.t.u. considerably below the rates prevailing for electricity.

While the future competitive situation between manufactured gas and electricity is not as favorable to the former

(Continued on Page 84)

*Numbers in parentheses refer to bibliography at end of paper.

TABLE NO. I. ESTIMATED ENERGY REQUIREMENTS OF THE UNITED STATES FOR 1930

Type of Fuel	Unit of Measurement	Est. Cons. in Millions	% Increase or Decerase over 1920	Equiv. Boiler H. P. in Millions	% U. S. Energy Requirements 1920	% U. S. Energy Requirements 1930
Coal	Short Tons	531	— 19.2	380,000	69.9	53.6
Coke	Short Tons	48	— 5.9	41,500	6.4	5.8
Wood	Cords	90	+ 1.3	45,000	6.6	6.3
Petroleum	Bbls.	898	+100.1	162,000	11.9	22.8
Gas	Cu. Ft.	2,463,900	+120.0	69,200	4.5	9.8
Electricity	Kwh.	120,000	+175.0	12,300	0.7	1.7

Merchandising Trends *of*

By GEORGE H. FINLEY

Managing Editor
Western Gas

THOSE at the helm of utility merchandising affairs in 1931-1932 have charted their course through troubled waters, with many present signs indicating better sailing ahead. Sales totals for most companies of course have dwindled, though in this respect the industry's record compares very favorably with general business volumes. The year past will go down as a period of hard selling, but it will be more vividly recalled for the wave of agitation against utility merchandising which has inundated one or two areas and threatened many more.

In a score or more states the anti-merchandising movement already has come to a definite head, being summarily defeated in most instances. In Kansas and Oklahoma, however, anti-selling laws are on the statute books, to the present sorrow of the utilities, general public, and many appliance dealers.

That proposals for curbing utility sales work have gained so wide a hearing in so brief a time has been in part a by-product of the depression. Receding profits have made some dealers temporarily receptive to anti-utility propaganda. It is to be noted that wherever a speedy effort was made to bring out the full facts on the issue, anti-utility racketeering failed of its purpose.

It seems certain that the stormy events of 1931-1932 have advanced utility merchandising in several major respects. They have placed emphasis upon the dealer appliance outlet, putting in motion hundreds of cooperative programs which will set a new pace in load building. They have focussed attention upon utility merchandising practices, finding them in the main on a high level, but in some instances detecting flaws which have been corrected to the betterment of permanent trade relations. Most important, they have brought a mass of evidence to demonstrate anew the vital need for utility leadership in appliance sales work.

While agitation and legislative attempts have held the center of the stage, the past year has brought other developments important to the utility merchandiser. Formulation of cooperative sales programs, and a growing recognition of need for more exact market knowledge, are among these. Some of the more significant highlights are passed in review in the paragraphs to follow.

Kansas-Oklahoma Experiment

Kansas and Oklahoma, with their restrictive legislation, command a leading place in 1931-32 merchandising news. On the time-tried principle that "the proof of the pudding is in the eating," the utility industry is watching the course of events in these trouble centers. Too little time has elapsed to pass final judgment, or draw precise conclusions, but there is much evidence from the Kansas-Oklahoma experiment to indicate that legislators will not rush into this type of legislation in other sections. The whole tone of utility-dealer relations is much improved, due in part to the lessons which are being learned in Kansas and Oklahoma.

While it is much too early to balance the record of merchandising experience under these prohibitory laws, *Western Gas* has undertaken to present an assortment of facts bearing upon the situation in these states. A number of utilities, both gas and electric, have cooperated in furnishing information for our purpose, though company names for the most part are withheld in the report.

The anti-utility merchandising law took effect in Kansas on August 1 of last year; in Oklahoma on July 1. Constitutionality of the measure in Kansas is now being contested in the courts by the Gas Service Co. group, these companies meanwhile continuing to merchandise under a stay order from the Kansas Supreme Court. Except for this instance, utility appliance selling is at a standstill in these two states.

Though these measures have been applied only a few months, opinion is definitely swinging against them. More will be said at a later point as to expressions from the general press in Kansas and Oklahoma. But first, let us examine the results as reported by several individual utilities—former merchandisers now banned from selling.

Company A, a natural gas utility, gives the following information as to the immediate consequences of the Oklahoma law on its system:

- 43 sales employees, with approximate annual income of $90,000, released from employment.
- 38 other employees, of $45,600 approximate annual income, released.
- $27,950 decrease in advertisig expenditures.
- $16,800 decrease in store rentals.
- $3,300 decrease in warehouse rentals.
- $5,000 decrease in freight and cartage.
- $3,800 (approximate) loss in local and state taxes on merchandise inventories and accounts receivable.
- $500 decrease in insurance.
- 3 manufacturers' and distributors' representatives (combined annual earning of $10,800) released.
- $3,600 miscellaneous decreased expenditure due to cessation of sales.

The above analysis is given in some detail to indicate the many directions in which this restrictive legislation had made itself felt. That it came during a general business slump only intensified the damage which it did. Multiplied by the number of companies formerly engaged in direct sales work, the totals of unemployment, loss of income, vacant stores, sales promotional expenditures, tax losses, mount to serious proportions in these states.

Even if increased dealer sales had maintained the level of utility-dealer sales volume (which has not been the case)—most of the losses enumerated above would still have resulted. When a leading appliance merchandiser in a community closes shop, those benefiting from his business are quick to feel the loss. And in turn, their loss is passed on to others in the business circle.

Company B, an electric utility serving well over 100 towns in Kansas, calls attention to the load building difficulties faced under this legislation. Quoting the new business manager of this utility:

"A review of the dealer situation on our particular property shows that in the smaller towns—I mean towns of 2,500 and less—we

1931-1932

have practically no electrical contractors and the hardware stores in these towns have been reluctant to put in any type of appliance except washing machines. In fact, we have over 15 towns between a population of 3,000 to 1,500 where you could not buy an electric range, sun lamp, vacuum cleaner, electric sewing machine, BX conduit, lighting fixtures, electric waffle iron, electric mixers and many other small appliances. Most of the merchants in these small towns are hardware merchants and they have added to their line of hardware a washing machine and generally one model refrigerator, which constitutes their electrical business. In our larger towns . . . chain stores are obtaining over 50 per cent of the electrical merchandise business. . . . In a review of all the towns we serve, it shows that there have been only two hardware merchants who have gone aggressively into the merchandise business. . . . These two merchants have taken on a fairly complete line of merchandise and they have been successful in selling electric refrigerators.

"Our territory is located in the center of the natural gas properties, but in spite of this fact in the years gone by we have averaged between 300 and 400 electric ranges during the year. We get a report each month of the business done by the electrical dealers and a review of the eight months they have been in business shows that there have been only 5 electric ranges sold by the dealers in our territory."

The condition described above exists in spite of well-organized effort on the part of the utility to create dealer business. Dealer contact men were employed in each division, cooperative newspaper advertising was done—yet results were so discouraging that these efforts have been practically abandoned.

Reference above to lack of results in hardware dealer sales is particularly significant, as hardware interests are credited with a greater part of the responsibility for passage of the Kansas law. They have done little to discharge their responsibility of maintaining sales volume.

Every gas company with distribution in smaller communities will appreciate the handicap the gas utilities of Kansas and Oklahoma are laboring under, and the inconvenience the public is suffering. In hundreds of small communities there are no dealers in gas appliances, save the gas company. The gas company is the only agency with sufficient resources to carry on sales promotion on a full line of gas appliances in these small centers.

Company C's experience since passage of the Kansas anti-merchandising law is described in the following statement from this utility:

"We have devised certain campaigns wherein we have carried newspaper and direct mail advertising at our own expense for the benefit of the dealers; we have arranged to finance installment sales of major appliances for them; we have placed our operating employees at work digging up prospects for the dealers; we are allowing the free use of our former appliance sales rooms for the display of appliances sold by the dealers. Yet, there is no denying the fact that the sale of appliances in our towns has fallen off materially because of the lack of intensive door-to-door work, arranging demonstrations and closing sales in the homes of the prospects. However, there are some localities where better results are being accomplished than in others, depending entirely upon the aggressiveness of certain dealers."

Company D, a natural gas operator with live merchandising policies, reports a discouraging drop in sales volume on its Kansas system, despite its inauguration of a dealer sales program. On the basis of its first seven months sales in 1931, up to the time when the anti-merchandising law took effect, and upon its previous year's experiences, this company estimates its sales during the closing five months of last year would have amounted to some 4,670 gas appliance units. Dealer sales for this five-month period came to approximately 2,697 units, of which from 10 to 15 per cent might be credited to gas company cooperative effort. Thus this company's enforced withdrawal from the market meant the loss roughly of 4,400 appliance units, totaling around $350,000 in retail sales.

This particular utility, having added a number of new gas communities to its system, finds itself extremely handicapped in loadbuilding. While dealer sales throughout its area are perhaps a fraction above normal, due to the effort which the gas company has put behind the dealer, the loss from the total appliance market is tremendous, and has undoubtedly made itself felt in all related lines of business activity.

Company E, an electric utility of Oklahoma, set up an extensive holiday appliance campaign during the pre-Christmas season, in which cooperation of 101 stores in 11 communities was secured. An analysis of this campaign from the standpoint of sales distribution is of interest. Accurate records were kept, yielding the following facts:

Chain and mail order stores, comprising 17 per cent of those participating, did 50 per cent of the unit appliance volume, but sold only 26 per cent of the retail value, handling much cheaper lines than other stores.

Department stores, representing 9 per cent of those in the campaign, did 20 per cent

The newspaper advertisement reproduced at the right is the opening "copy" in a campaign just launched by the Missouri Association of Public Utilities. As this message indicates, its aim is to give the Missouri public facts on utility merchandising.

FACTS YOU SHOULD KNOW
about
UTILITY MERCHANDISING

WHAT HAPPENED in KANSAS . . .

After passage of the "Utility Merchandising Law" in Kansas everyone suffered—Factory branches and distributors withdrew, shops were closed, route wagons lost, salesmen discharged or taken off the road, transportation, filling stations, restaurants and hotels lost business and retail business slumped. General sentiment for repeal was reflected in resolution of Kansas Press Association passed unanimously Jan. 14, 1933.

"On the grounds of depriving cities and towns of adequate service and contributing to empty store rooms and unemployment, we urge the repeal of the law known as the 'Utility Merchandising Act' believing its operation has been a detriment, rather than a benefit to communities."

SHALL IT HAPPEN in MISSOURI?

WHAT IS UTILITY MERCHANDISING?

It is the selling at retail to the public of reliable appliances and equipment for gas and electric service, such as stoves, heaters, vacuum cleaners, boilers, washing machines, refrigerators, etc., at fair prices—and the prompt, expert servicing of all this equipment in the home.

It is now freely admitted throughout Kansas that a sad mistake was made in 1931 by the hasty passage of a state law known as the Kansas "UTILITY MERCHANDISING ACT." The immediate disastrous effects of the law are shown at the left.

So the Public May Know

Believing that complete widespread knowledge of the dangers and dire effects of such a law, will prevent MISSOURI from making a similar mistake, we will, in a series of advertisements in this newspaper show:

The Benefits of Utility Merchandising

1 TO THE PUBLIC

By upholding standard of merchandise quality.
By placing modern home conveniences within reach of all.
By giving better service.
By helping make fair prices.
By rate reductions.
By providing prompt, expert servicing of all equipment.
By keeping men at work.
By maintaining factory and wholesale contact.
By providing modern equipment to the farm and rural community.

2 TO THE RETAILER

By cooperative advertising.
By helping maintain fair prices.
By cooperative sales plans.
By fair, clean competition.

3 TO GENERAL CONDITIONS

By keeping distributors and factory branches active locally.
By reducing unemployment.
By helping carry trade thru bad periods.
By giving local factories and merchants support.
By contributing to store credits.
By providing business for transportation, hotels, filling stations, etc.

We know that you do not want your community to be deprived of the many benefits of Utility Merchandising you now enjoy. The experience of Kansas should be convincing. It is of vital interest to you to know the facts. Read every ad to follow.

MISSOURI ASS'N. of PUBLIC UTILITIES

of the unit volume, and sold about 25 per cent of the retail value.

The 29 electrical stores did 10 per cent of the unit volume and sold nearly 20 per cent of the retail value.

The 12 hardware and 7 furniture stores in the campaign, combined, did only 6.5 per cent of the unit business and sold about 10 per cent of the sales value.

Results in this campaign, so far as distribution of sales goes, bear out the experience reported elsewhere in Kansas and Oklahoma. Mail order houses sell the volume; other agencies and particularly so the hardware-furniture group, benefit to a negligible degree, if at all.

Dealers are learning from the Kansas-Oklahoma experience that there is no definite appliance market, to be parcelled out lot-for-lot to the total number of retail appliance outlets when the utilities cease selling. In the first place, the total appliance market is a function of the effort expended to develop it. No effort, no market. In the second place, when the utilities step out, and their stimulus is at least partly withdrawn from market-building, that market which remains will be served by the agencies which go out after it.

All-in-all, the Kansas-Oklahoma experiment shows the load-building programs of the utilities to be suffering severely, while dealer sales have noticeably failed to reflect the increase predicted by proponents of this legislation. In these states most utilities are hard at work on the dealer sales problem, attempting to increase the normal dealer volume to at least partially offset the lack of utility merchandising. But the utility can work through the dealer only to a limited extent in maintaining appliance markets. Repeal of the legislation is to be heartily desired, for the good of the public, the dealer, and the utility.

More Proof Utility Leadership Needed

If more evidence than that supplied by the Kansas-Oklahoma experience were needed to demonstrate what happens when utilities withdraw from sales work, it is at hand in a number of areas not troubled with anti-merchandising legislation. A few examples may be of interest.

In 1929, when the gas utility serving a west coast market was actively merchandising gas ranges in certain communities, one manufacturer's dealer outlets in these communities sold $10,000 worth of his range line. In 1930 the gas company withdrew from range selling in this area, and the same dealers, who had added no new lines and had changed their selling methods not at all, sold only $4,000 in ranges. Since general gas appliance volumes in the two years were comparable, the effect of the gas company's withdrawal is apparent.

An example from electric range selling aptly illustrates the necessity for utility sales in a promotional line. The Southern California Edison Co. at the request of dealers in Long Beach, Calif., discontinued selling appliances in that city in October, 1930, the dealers assuring that load-building volume would be maintained. Total range sales for the corresponding 11-month period dropped off 76 per cent. The same company repeated this experience in its San Joaquin Valley territory in 1931, here again suffering a 76 per cent drop in range sales from the year 1930 when it sold ranges. The Southern California Edison Co., incidentally, has a 7.9 per cent saturation of electric ranges among its consumers. This compares with a 1.2 saturation of electric range users among the electric consumers in Los Angeles, where sales are made only through dealers.

To the gas man this electric range promotion has a close parallel in gas refrigerator merchandising. If the refrigeration load, on which the electric industry has such a lead, were left to the dealer to develop it would go unsold. As it is, the utility is building a gas refrigerator demand in which the dealer will share to an increased degree.

Grounds for Encouragement in Present Situation

The skies are rapidly clearing, on the utility merchandising problem. Factors contributing to the clarifying of this issue have been: Constructive work of utility associations, national and local, in setting up and securing adherence to merchandising creeds; general inauguration of dealer cooperative programs; failure of the laws in Kansas and Oklahoma; staunch support of the utility merchandising principle by the press; public informational campaigns such as that of the Missouri Association of Public Utilities.

Merchandising principles sponsored by the American Gas Association and National Electric Light Association, widely adopted by regional associations, are too well known to require reviewing here. Accompanying them went the strong recommendation that each utility take the initiative to bring about conferences with its own dealers, and adapt these principles to their local needs. All over the nation, as a result, local dealer programs have been getting under way. Dealer interests are in a better position than ever before to know the utilities and their problems; utilities realize as never before the desirability of making the appliance business mean more to the dealer.

It is impossible in the space available to review the many dealer-cooperative programs reported to *Western Gas* in recent weeks. Dealer activities of a number of companies which have been in action for some years, are well known to the industry. Hundreds of other companies for the first time are now developing dealer programs. Of particular interest is the work of several companies, themselves active merchandisers, which have inaugurated dealer activities simultaneously with introduction of natural gas, and produced real sales results.

Cooperative Sales Results

Properly handled, dealer cooperative activities will build load where it is most needed, and do it rapidly. As an example, the first cooperative gas range campaign ever conducted in Southern California was concluded last month. It extended for nine days, resulted in the sale of some 1,650 ranges (80 per cent dealer sales), and greatly increased unit prices per range over usual averages, in some cases as much as 50 per cent. Department stores, furniture and hardware dealers, gas companies and manufacturers were drawn together in a concentrated selling effort; heavy advertising through newspapers, billboards and other media increased appreciation for the modern gas range. Dealer enthusiasm resulting from this initial campaign will result in kindred efforts on other appliances.

Similarly, in the New York area cooperating dealers on a leading utility gas system increased their sales more than 50 per cent last year over 1930, through active participation in the company's sales program.

Associations Serve

Working on the trade relations problem in their own scope, several regional associations have constructive enterprises under way. The Pacific Coast Gas Association, in cooperation with the Pacific Coast Electrical Association and Pacific Coast Electrical Bureau, is undertaking a trade relations study touching manufacturers, jobbers, retailers and public utilities. A field representative has been appointed to engage in this work.

Of much present interest is the campaign to the public which the Missouri Association of Public Utilities has just launched. Active newspaper advertising in virtually every daily and weekly paper is being done by the Association, the messages treating of benefits which the public derives from utility merchandising, of utility cooperation available to dealers, of the ill effects from legislation in Kansas and Oklahoma. Some of this advertising is reproduced with this article. Missouri utilities, with the ex-

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Practical Aspects of
Pipe Line Soil Surveys

By GUY CORFIELD

Chemist, Los Angeles Gas and Electric Corporation

AS A RESULT of the amazing and unparalleled growth of the natural gas industry, and the enormous network of pipe lines that is being woven in all parts of the country, pipe line installation is rapidly assuming the status of an exact engineering science. Construction costs and time intervals are accurately forecast and provided for, and the physical structure is so built as to furnish the desired service without premature failure in any part or detail. The successful completion of any such project calls for the coordination of a wide variety of operations both technical and practical, both spectacular and commonplace. The particular operation with which this article deals, that of soil survey, is neither spectacular nor commonplace, but should be both technical and practical to furnish the greatest usefulness.

Scope of Soil Survey

This article is written with the idea in mind that the function of soil survey is to develop advance information so that the pipe can be installed in the ditch with adequate but economical protection against soil corrosion. Analyzing this we will find that such information must consist of data on soil analyses, topography, and distances and quantities of various types of protective media. These three items are of equal importance. As regards the first, soil analyses, the necessity is obvious. Information regarding the second, topography, is vital, because in certain localities certain types of coating cannot be used, either for the reason of difficulties in transportation of materials or equipment, or because of application hazards or difficulties that would impose unreasonable or impossible working conditions on the men, resulting in poor application or uneconomic expenditure of time and labor. The third item, defining the various types of coatings that may be used and their distances and quantities, is necessary so that orders may be placed well in advance, insuring proper understanding by manufacturers and supply houses and delivery on the line of the correct quantity at the proper time and place. Thus the job will not be held up to wait for pipe coatings, and the lack of materials and equipment, with the resultant substitution and improvisation, is one of the greatest enemies of good protection. The foregoing information can best be furnished by the man who has traversed every inch of the line making the soil survey. Obviously he should be familiar with general pipe line procedure and coating application as well as the various aspects of soil behavior.

Guy Corfield

Soil Analyses

The theoretical and technical aspects of soil analysis to pre-determine corrosiveness will not be dealt with in this article, as the subject has already been thoroughly covered in the literature. It will be sufficient to refer to a few of the recent publications on the subject. (See appendix.)

Soil Sampling and Field Examination

Samples should be taken and tests made at pipe depth, as often the underlying strata are much different from the surface soil. Even if samples are not taken, as in the case of Shepard Rod readings, a few handfuls of soil should be brought to the surface for examination, which will show if soil has changed; whether it is moist or dry; whether it will exert "soil stress" on the coating by gripping, shrinking and expanding; or whether it will tend to injure the coating by puncture with small stones or gravel, or by backfill impact of large pebbles or hard clods. Frequency of sampling (for laboratory test) will depend on the laboratory and field methods used, the frequency with which the soil changes and the accessibility of the country. If a combination of laboratory tests and field resistance readings are to be made, the latter will indicate the need for the former. The writer recommends that samples be taken approximately every half mile. No additional time is required, as soil is brought to the surface in any event, and the small sample bulk (not more than one quart) does not constitute a transportation problem. All samples do not necessarily have to be tested, but will often be found invaluable for subsequent visual examination, and for checking against field data when a decision is difficult or notes are obscure. Topography observations, as dealt with in the next section, also help to indicate soil changes. Difficult and inaccessible country should be sampled very thoroughly, so that the possibility of having to return for re-checking or additional data is minimized.

It will be found very valuable to mark every sample and test point with a small wooden stake (like a surveyor's stationing stake) carrying a reference number corresponding to the data entered in field note book, and also identification such as initials of name of pipe line company. Such stakes make it easier to locate oneself if subsequent trips along the route become necessary. Too much emphasis cannot be placed upon the necessity of making copious field notes so that not only may nothing pertaining to the soil or terrain be left to the memory, but also that locations and distances may be correct and capable of proper interpretation into construction maps and office records. Sample and test points should be identified in every way possible, preferably by distances from permanent landmarks. Survey stakes are ideal for this, but should be used only to obtain distances, as they may later be destroyed or changed. All cross roads, section posts and fences, stream beds, houses, and miscellaneous landmarks should be noted. Distances can be obtained by speedometer, by counting telephone poles, and by chaining or pacing where necessary to accurately define the limits of some small section requiring selective treatment.

Topography

While traversing the route, the topography should be examined in both its detailed and its general aspects. Surface indications will be found productive of much valuable data. Alkali out-croppings on the soil, or encrustations along

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Pacific Coast Gas Association

Managing Director: Clifford Johnstone

Association Headquarters: 447 Sutter St., San Francisco

President: Jas. L. Stone

Vice-President and Gen. Manager, Spokane Gas and Fuel Co.

Convention Moved to Del Monte

PRESIDENT Stone has recently addressed a letter to all members of the Association informing them that due to business conditions the Board of Directors had deemed it advisable to transfer the 1932 Convention from Spokane, Wash., to Del Monte, Calif.

This decision was made with a great deal of regret as it is well known that a number of members had been planning to make the Convention a part of a vacation trip through the scenic wonders of Washington and Oregon. However the bulk of the Association membership resides in Southern and Central California and it was deemed inadvisable to ask them to incur the expense of a trip into the Northwest. A convention is promised to the Pacific Northwest as soon as business conditions improve.

Most of our members are familiar with the beauties of the Monterey Peninsula and the perfect facilities and seclusion offered by Hotel Del Monte for business conventions.

The deep interest this year in solving the problems of competition and of business development in the face of depression will make this Convention one of the most important in the history of the Pacific Coast Gas Association. Business meetings will be confined to three days, August 24, 25 and 26 inclusive. These three days will be filled to the brim with serious and thoughtful discussions of the gas industry's problems in which leaders of the industry from all parts of the country will participate.

Committee reports, as last year, will be published in the August number of *Western Gas* and will be discussed but not read as a part of the Convention program. Committee chairmen have been advised that reports must be completed and turned in shortly after the 15th of May.

National, Local Cooperative Advertising

AT LAST the gas industry seems to be upon the verge of embarking upon a campaign of national advertising, and it is to the credit of manufacturers of gas appliances that they have taken the initiative in this matter.

The project was initiated by W. Frank Roberts, chairman of the Range Division of the Manufacturers' Section of the American Gas Association, at a meeting of the section held in Chicago on February 18. Mr. Roberts' suggestions were met with enthusiasm and a representative committee of manufacturers appointed immediately which was backed with substantial pledges of financial support.

The plans of this committee are now fully formed and will be presented for ratification at a general meeting of the Manufacturers' Section to be held in New York on May 12. Present indications are that a three-year campaign will be outlined involving expenditures of approximately $2,000,000 a year.

Another example of the vitality of the gas industry and the confidence of gas appliance manufacturers in its future, is the cooperative advertising campaign being outlined by manufacturers and dealers in Northern California. This campaign for the time being will involve only gas ranges and circulating heaters and will be financed by contributions from both the manufacturers and the dealers.

The campaign will be managed by the Gas Appliance Society of California of which O. C. Bunster of San Francisco is president. Miss Jean Frickelton, secretary of the Society, will be in active charge of details.

New San Francisco Gas Appliance Ordinance

THERE is every evidence that a gas appliance ordinance will shortly be passed by the Board of Supervisors of the City and County of San Francisco. This ordinance has been under consideration for a number of years, but recent agreement on this project by city authorities, the Gas Appliance Society, the plumbers and sheet metal workers, and other interested parties gives hope for its early enactment.

The ordinance contains provisions regulating the installation of gas piping, the location of meters, the character of gas appliances and their installation, and places authority over these matters in the Department of Health. Inspections will be made by the Plumbing Inspector. Permits, for which a small fee will be charged, will be required for practically all appliance installations. All appliances installed must be approved by the Board of Health, and in making this approval the Board will no doubt be guided by the approvals of the Laboratory of the American Gas Association.

The ordinance is quite strict in its venting requirements, although approved unvented appliances are permitted under certain conditions of occupancy and requirements as to ventilation.

Under the terms of the ordinance the city will undertake the inspection of gas house-piping, the responsibility for which has heretofore been unofficially assumed by the Pacific Gas and Electric Co.

The Addison B. Day Medal of Honor

THERE has been mailed to all members of the Association a pamphlet describing the Addison B. Day Medal of Honor, the first award of which will be made at the Del Monte Convention.

A. B. Day

This medal has been made available through the generosity of Mr. Addison B. Day, President of the Los Angeles Gas and Electric Corporation. Mr. Day served as President of the Pacific Coast Gas Association in 1920, and has always taken a deep interest in the Association and an active part in the guidance of its policies.

Any member of the Association is eligible to receive the Medal of Honor. One award will be made each year to the member who is judged to have done the most for the advancement of the industry. It is open to members in any line of endeavor. The award will be

made by a committee composed this year of President Jas. L. Stone, H. L. Masser and three other Association members appointed by President Stone.

As an aid to the committee, members are urged to offer recommendations to the committee either in their own behalf or in behalf of their friends. Recommendations should be sent either to President Stone in care of the Spokane Gas and Fuel Co. Spokane, Wash., or direct to the office of the Association.

William I. Battin Named General Supt. and Engr. for Seattle Gas Co.

WILLIAM I. BATTIN has been named general superintendent and engineer for the Seattle Gas Co., Seattle, Wash., succeeding J. Sanford Holt, who has been transferred to the Georgia Public Utilities Co., Augusta, Ga., as manager of the plant. Announcement of Mr. Battin's appointment was made recently by James F. Pollard, general manager for the company.

Wm. I. Battin

Mr. Battin assumes charge of the operating activities in the Seattle Gas Co. with a background of wide experience in the gas business. His past two years have been spent as assistant to the operating vice-president for gas in Central Public Service Corp. This included activities in both natural and manufactured gas distribution systems.

During the 10 years that he was with the United Gas Improvement Co. of Philadelphia, Mr. Battin served in the contract and construction department and also conducted special investigations in connection with plant extensions and improvements.

He spent seven years as engineer for Indiana Lighting Co., both in Indiana and Ohio, and 10 years as superintendent of South Station of Peoples Gas Light and Coke Co. Also, he served as manager of the Sheboygan Gas Co. in Wisconsin at one period.

Oregon Utilities Segregate Merchandise Accounting

Effective April 1, 1932, in conformance with an order of the Public Utilities Commissioner of Oregon, utilities of that state are following a new accounting form for their merchandising and jobbing operations, segregating the accounting for merchandising operations from that for other company functions. The commissioner's order referred to the recent N.E.L.A. recommendation that such segregation be made, and stated that if the several utilities of Oregon desired to separate their regulated utility business from their unregulated mercantile activities, there was no objection to this course. The order set up accounting forms to be followed in merchandising and jobbing operations accounting.

George Gregson is Named Manager of Wainwright Gas Co.

Announcement was recently made of the appointment of George Gregson as manager of the Wainwright Gas Co., Wainwright, Alberta, succeeding P. Graham.

Program for Oakland Appliance Society

UPON invitation of the Oakland Unit of the Gas Appliance Society of California, the Pacific Coast Gas Association furnished the program for a meeting held in Oakland on April 22.

The program consisted of a series of short talks by a number of members of the Pacific Coast Gas Association, each of whom has been active in some of the business development work being conducted by the Association. The speakers included E. J. Hinchey, sales manager of the Jas. Graham Manufacturing Co., who discussed the part manufacturers are playing in cooperative advertising and sales work. Mr. Hinchey also briefly touched upon the principles behind the recent formation of the Manufacturers' Section in the Association.

C. B. Babcock, president of the C. B. Babcock Company, discussed the efforts of the Association to promote the passage of sane gas appliance ordinances which would provide for the proper installation of American Gas Association approved appliances. Mr. Babcock has been chairman of the Gas Appliance Society committee working on San Francisco's new gas appliance ordinance.

J. Chas. Jordan, assistant manager of advertising and publicity of the Pacific Gas and Electric Co., and chairman of the Association's committee on Cooperative Advertising, discussed the advertising being done by the Association through his committee.

L. F. Galbraith, division sales manager of the Pacific Gas and Electric Co., and a past chairman of the Association's Commercial Section, discussed the work of that Section in correlating market data and in promoting sound load building activities.

C. A. Swigart, trade relations representative of the Pacific Coast Gas Association and the Pacific Coast Electrical Association, discussed the poblems of merchandising as they relate to both dealer and utility.

The speakers were introduced by Clifford Johnstone, managing director of the Pacific Coast Gas Association.

Death Comes to C. J. Yorath, Canadian Utility Leader, April 3

C. J. YORATH, president and managing director of Dominion Gas & Electric Co., died at Calgary, Alberta, on April 3 after an illness of two weeks, a victim of heart disease. Mr. Yorath was born in Cardiff, Wales, and was 52 years of age. He is survived by a widow, two sons and one daughter.

Mr. Yorath was a leading figure in the utility industry of western Canada. It was under his direction that the International Utilities Corp., of which he was president, was purchased by Dominion Gas & Electric Co. With this deal consummated, Mr. Yorath became president and managing director of the Dominion organization. In addition to this post, Mr. Yorath was, at the time of his death, president of the Canadian Western Natural Gas, Light, Heat & Power Co., Ltd., of Calgary, and the Northwestern Utilities Ltd., of Edmonton; he was president and managing director of the Gas Production and Transporting Co., Union Power Co., Drumheller Consolidated Collieries, Ltd., Nanaimo Electric Light, Heat and Power Co., Duncan Utilities, Ltd., Mid-West Utilities Ltd., and a director of the London and Western Trust Co. and the Alberta Regional Board.

Mr. Yorath was a member of the Institute of Civil Engineers, Great Britain, and the Canadian Institute of Civil Engineers.

Vernon S. Beck to Head New Combustion Engineering Co.

Vernon S. Beck, for the past five years chief engineer for the Sonner Gas Burner Co., Winfield, Kan., has left that company to become the head of the Beck Engineering Combustion Kompany of St. Louis, Mo. The new organization will manufacture a line of burners including new types manufactured under new patents, as well as types already on the market. A line of burners to meet the demand for special orders for boiler and furnace companies will be offered.

Mr. Beck holds degrees in mechanical and electrical engineering, and has been engaged in engineering construction work for several years.

Vincent D. Kennedy, So. Calif. Representative for R. R. Commission

Vincent D. Kennedy, former secretary to Ex-Governor Young of California, and for the past year examiner with the State Railroad Commission has been named southern California representative of the Commission it was announced recently by Clyde L. Seavey, president of the California Railroad Commission. Mr. Kennedy's headquarters will be maintained in the Los Angeles office of the commission, effective April 1.

Bivens' Company Brings in Gas Well at Payette, Ida.

Idaho Gas & Utilities Corp. reports that it has brought a gas well with an open flow of 1,000,000 cubic feet daily on the structure about 2 miles east of Payette, Ida. The discovery well is on the Payette anticline, 9 miles south of Crystal Dome where much drilling activity was carried on last year. C. E. Bivens of Laramie, Wyo., is president of the company.

Southern Counties Gas Co. Trying New Billing Procedure in Two Districts

Southern Counties Gas Co., Los Angeles, Calif., inaugurated a new system of collecting monthly bills in two of its districts recently. Messengers have been hired to deliver the bills in the Santa Barbara and Fullerton districts. This system furnishes part time work for a man in each city served by the two districts.

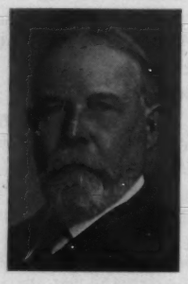
MEASUREMENT and CONTROL

The Motion and Measurement of Fluids

By George Sydney Binckley

*Member, Am. Soc. C. E.**

THE distribution, measurement, and utilization of water for irrigation and domestic purposes is one of the most ancient of all engineering functions—the beginning of all problems in fluid measurement. The time element was certainly the first to be given definite terms, for the flow of water through a ditch or opening to a field would naturally be regulated by reference to the fixed standard given by the apparent movement of the sun and stars. But the determination of the rate of flow—the other essential element in the problem—did not come for a long time, and as a matter of exact knowledge this element is of quite modern development.



Col. G. S. Binckley

It is true that from the most ancient times, water has been supplied for domestic use from skins carried on the back of the waterman and doled out by the cup—a practice common in the orient today and probably the earliest form of the regular measurement of fluids. But this did not involve the two elements with which we generally have to deal in most fluid measurement—time and rate of flow. However, both these elements entered into the operation of certain ingenious automatic devices employed at least several centuries before the Christian era for the sale of "holy water" in the temples of those days. One of these highly efficient "nickle-in-the-slot" machines is described in his "Spiritalia" by Heron (Hero) of Alexandria, a distinguished scientist and inventor who lived about the first century A.D. As shown by Ewbanks in his "Hydraulics and Mechanics," this device consisted of a large vase having within its body a small reservoir for the "Holy-water" provided with a valve in the bottom, operated by a lever which was momentarily depressed when a sufficient amount of hard coin was dropped through a slot into the little pan on its opposite end. As the valve was raised by the financial pressure on the other end of the lever, the coins promptly slipped off, so the amount of "holy-water" delivered for a sum equal to about 75 cents of our money would hardly be approved by a modern Railroad Commission. In fact it was a scandalous and highly profitable graft. It is none the less interesting, however, in the fact that both the time element and the rate of flow as limited by the capacity of the valve were involved in the *quantity* of water delivered. It seems likely that these little machines actually represent the earliest combination of definite *time* and *rate* in the measurement of fluids.

The first example of a highly standardized method of fluid measurement on a large scale is found in the water supply system of Rome.

Fourteen aqueducts were comprised in the system of water supply for Rome, so it is easy to see that their care and the distribution and measurement of the water to the thousands of consumers was a serious matter.

Most of what we actually know of the Roman water supply system and the distribution of the water we owe to Sextus Julius Frontinus, a distinguished Roman general who was appointed Water Commissioner of Rome in the year 97 A.D. Frontinus wrote a book on the aqueducts of Rome, and in this described in great detail the sources of the waters, their qualities, and what at the moment interests us most, the manner in which this water was distributed and measured out to the consumers.

Early in his book he complains of the traditional crookedness of the water-masters who had direct charge of the distribution of the water. They were certainly master-grafters, for Frontinus tells of how they had oversize pipes put in from the aqueducts to the distributing reservoirs and under-size delivery orifices, leaving them a pretty margin of water for private sale.

In the system for the distribution of water in Rome we have an example of highly standardized orifice measurement. Indeed it is certain that never before and probably never since that time has the standard orifice been so extensively employed for the measurement of water. No water was allowed to be drawn direct from the aqueducts except into distributing reservoirs, and from these it was taken through lead pipes to secondary reservoirs or direct through the standard calix or orifice to the consumer. In the latter case, the water entered the calix under a standard head, and it was required by law that the discharge should pass through at least 50 feet of pipe the same size as the calix before it could be released or passed on into a larger pipe. It is plain from this that the effect of friction was fully recognized, and recognition is also given by Frontinus to the fact that setting the calix at an angle or on the bottom of the conduit from which it drew water has an important effect on the discharge. The distribution of water was through lead pipes varying from 1 to 12 inches in diameter, many tons of which have been found by excavation in modern times. It is interesting to note that an ancient bronze cock of such large size that it takes two men to lift it, was so well fitted that water trapped in the plug is still retained, and can be heard to splash about when the valve is moved.

The standard or basic Roman ajutage or calix was of bronze and had a diameter of 1¼ digits (the digit was 1/16 of a Roman foot) or 0.94 of a Roman inch (0.91 of an English inch). Upon this standard orifice was based the designation and calculated the capacities of the larger orifices. The capacity of the basic orifice was calculated by Clemens Herschel to be from 5,000 to 6,000 gallons per 24 hours under the heads ordinarily employed, and the larger sizes were increased by fixed increments of diameter of one-quarter of a digit, these sizes being designated as "five-pipe," "six-pipe," etc., up to "20-pipe." While the orifices were desig-

*Excerpts from a paper presented before the Southern California Meter Association.

20 Memberships Received at S. C. M. A. April Meeting

TWENTY new active members were admitted to the Southern California Meter Association at the meeting of April 28, held at the Los Angeles Gas and Electric Corp. building following dinner at the 7th and Flower St. Pig'n Whistle Cafe.

An excellent program for the meeting featured a paper on "The Heating Value of Gases", and two reels of moving pictures shown through the courtesy of the Linde Air Products Co. The paper was delivered by Guy Corfield, chemist for the Los Angeles Gas and Electric Corp., and will appear in an early issue. T. R. Walthers, assistant district manager at the Los Angeles office of Linde Air Products, exhibited the film, which dealt with modern welding practice.

President P. W. Hill, introducing the business meeting, called attention to the fact that many companies are losing mercury from orifice meters in isolated locations, due to thievery, and urged for cooperation in checking this loss. He also stated that the Association's Handbook, now in its third edition, is still in considerable demand. Orders for the Handbook, which sells at $2, may be addressed to the Association at Box 1100, Station C, Los Angeles.

A. E. DeBurn, after announcing results of the Jubilee Golf Tournament in which Harry C. Dahl took permanent possession of the S. C. M. A.-*Western Gas* Goodfellowship Trophy for last year, called upon G. H. Finley of *Western Gas* who congratulated Mr. Dahl. The third Goodfellowship Trophy for monthly tournament play during the coming season was exhibited to the meeting.

B. M. Laulhere Engineering Supervisor for So. Calif. Gas

B. M. Laulhere, for the past 15 months with Southern Fuel Co. in the capacity of superintendent of construction, has been named engineering supervisor for Southern California Gas Co., Los Angeles, his appointment becoming effective May 1.

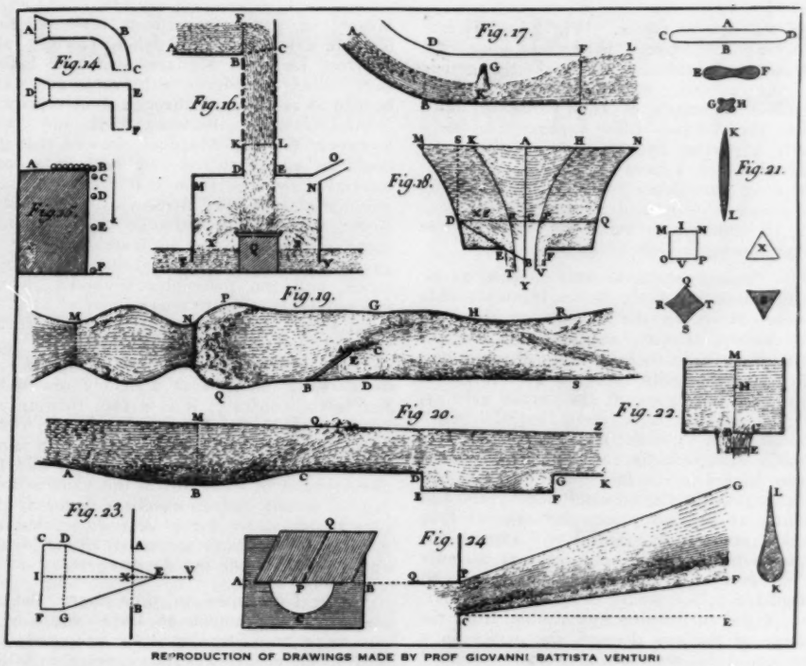
nated in this manner, their capacities were, however, calculated in terms of square digits of cross-section, and above the "20-pipe" size the actual cross-section in square digits was employed in designating their size. Although actual details of the design of these standard orifices are not at hand, they were rigidly standardized by law, and all bore an official stamp. Three of the small bronze ajutages, supposed to have been found at Pompeii, are in the Museum of Naples.

It is hardly open to question that the generations of grafting Roman water-masters knew quite well that a single large orifice would under like head conditions discharge much more than a number of small ones having the same aggregate cross-section. So, while it is unlikely (though indeed far from impossible) that these crooks deduced actual formulae from what they observed, and what passed down from those who had gone before, they very probably derived empirical coefficients that would indicate with a fair degree of accuracy just how much water they could steal for private sale under any ordinary set of standard conditions. The evidence would seem to justify us in concluding that the determination of coefficients of discharge through an orifice is by no means a modern development in engineering, but received very earnest and fruitful study about 2,000 years ago, although we must admit that these labors were hardly in the interest of abstract science.

But Roman research, even such as it was, went the way of the rest of the Roman civilization, and for centuries after the long night of the Dark Ages little or nothing was added to the knowledge of the laws which govern the movement of fluids. Indeed, the little that was known to the ancients was lost, and even the records of such men as Leonardo da Vinci and Roger Bacon give but little evidence of any real knowledge of hydraulics or pneumatics.

It was not until the first quarter of the 18th century that the fundamental laws of fluid motion were actually formulated. Bernouilli, born in 1700, published his monumental work "Hydrodynamica" in 1738. He was one of a family distinguished through several generations for their pre-eminent mathematical talents and achievements, and his work was of fundamental importance to the science of fluid motion. Chezy, to whom we are indebted for the fundamental velocity formula, lived from 1718 to 1798, and Venturi, one of the most distinguished hydraulicians who ever lived, was born in 1746.

It is a curious fact that the simpler principles of pneumatics seem to have been much better understood and far more extensively utilized by the ancient than was the case in the later middle ages or even the earlier days of our modern scientific development. The priesthood of the ancient civilizations—centuries before the Christian era—utilized the elastic qualities of air and its difference in gravity from that of water, for the production of seeming miracles in the temples. They recognized the expansion of air through heat, and devised one of the most ingenious hydro-pneumatic devices of which I have knowledge—a basin into which water is poured, starting by this act the play of a fountain from the center of the same basin, and apparently causing the water to rise by gravity above its own level. Ewbanks, in his old work "Hydraulics and Mechanics", (now many years out of print) gives many and interesting examples of the applications of such knowledge made by the ancients. But like other ancient arts the renaissance of pneumatic science came only within the last few centuries, and it is well within the last 50 years that real progress has been made in the utilization and measurement of elastic fluids.



REPRODUCTION OF DRAWINGS MADE BY PROF GIOVANNI BATTISTA VENTURI

Fig. 1

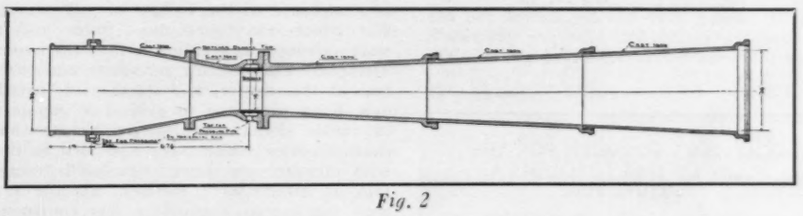


Fig. 2

The laws of hydraulics are fundamental to those which govern the movement of elastic fluids and their behavior under constraint, but these are complicated by the element of elasticity and the important changes of temperature which an elastic fluid undergoes with variations of pressure. It is fortunate indeed for the gas or pneumatic engineer that the science of hydraulics reached its present high state of development before the problems of the movement and measurement of elastic fluids had to be solved. And while the sequence is accidental, it is also logical that the development of the more complex laws should have followed those of simpler form.

Passing over the earlier and highly theoretical work of research in the first part of the 18th century, we find in Venturi the first great combination of eminent scientific knowledge and highly practical engineering ability. For Venturi was not alone a man of great and varied talents—diplomat, statesman, university professor, and scientist—but a practicing civil and hydraulic engineer. His research on the effects of form in the discharge through orifices was of monumental importance, and he appears to have been the first to realize and properly appraise the serious effects of turbulence on fluid motion. That he did fully recognize this factor is shown very clearly by his sketches, some of which are reproduced in Fig. 1. He recognized and studied the "Hydraulic jump" and made practical use of this phenomenon in the drainage of low land near Rome. The famous Venturi Tube is his best known invention, and his understanding of the principles involved was complete. Yet Venturi himself did not recognize its possibilities as a measuring device. Indeed, our own greatest hydraulician, James B. Francis, who studied the Venturi tube with the aid of very carefully constructed apparatus during the course of his classic experiments at Lowell, Massachusetts, in the early 'eighties, failed to grasp the greatest value of this device. However, at this time he did develop his famous formula for discharge over weirs, and his labors gave us the basis for practically all subsequent work along these lines.

Clemens Herschel, honorary member and past president of the American Society of Civil Engineers, took up the study of the Venturi tube in the middle 'eighties, and it was not until then that its possibilities as a measuring device were recognized. He completed his experimental work and published its results in Transactions of the American Society of Civil Engineers in November, 1888. From that time, this device has been the best we know for the measurement of

HERSCHEL'S VENTURI FORMULA

$$V = c\sqrt{2g\ (H - h)}$$

Where,

V = throat velocity in feet per second.

H = differential pressure in feet of water.

h = head in feet of water, corresponding with velocity of of approach at upstream end of tube.

c = a coefficient, generally from 0.96 to 0.98.

Fig. 3

large volumes of water. (Fig 2.) His formula for throat velocity is of great simplicity, and is purely rational. This fact, together with the constancy of the coefficient "c" and the close approach of this value to unity makes the Venturi tube approximate more closely a perfect hydraulic device than any other of which I have knowledge. Its freedom from turbulence of flow, its extremely low pressure drop, and its dependable accuracy all combine to make the Venturi tube unique among devices of its class.

The Venturi tube is as well adapted to the measurement of gases as to incompressible liquids. However, the changes in temperature, density, velocity, and pressure which a gas must undergo in its passage through any orifice is of necessity recognized in formulae for the determination of the throat velocity. For this purpose it is likely that Coleman's formula (Fig. 4) is the most complete. This formula is apparently rational, and its complexity is due to the fact that every element in the signficant changes of temperature and pressure as the gas passes through the tube is taken account of. And I will express the suspicion that a genuinely rational formula for the flow of a gas through what we call a standard orifice would be quite as complex, even if the turbulence inseparable from the passage of the gas through the orifice in a plate could be rationalized at all—which I seriously doubt.

Of the methods employed for the measurement of water, few devices except the orifice and the contracted tube are practically adapted to the measurement of gases. The history of gas measurement may be said to date from the time when Doctor John Clayton, Dean of Kildare, sometime before 1691 filled bladders with coal gas, and burned it as it issued through a hole pricked in the bladder. Between 1792 and 1802, however, William Murdoch showed that gas could be manufactured and used on a commercial scale, and from that time on it was established in Great Britain as an industry. Being a relatively valuable and manufactured commodity, the accurate metering of gas was from the first a problem of importance, and the principles involved in the modern types of consumers' meters, and the great "wet" meters for station use, were developed a long time ago, and with little change except in detail, these meters are used today. In spite of a deeply rooted belief to the contrary, it is a fact that an accurately calibrated house meter tends to become "slow" instead of "fast" with time, due to the stiffening of the bellows, and the development of leaks due to this same stiffening. I myself had an excellent meter of this type in my house for a year or so, but the gas company became suspicious of its loyalty and changed it—to my deep regret.

While from time to time many devices for the measurement of large volumes of gas have been developed or proposed (including the electric resistance meter, in which the gas temperature is raised, and the heat absorbed by this rise in temperature is used as a measure of the weight of gas passing) that which has found most favor and almost universal application is the orifice measurement. The extreme simplicity and cheapness of this device, and its ease of installation, have combined to give it a popularity of rather doubtful validity. Yet the very characteristics which have appealed to those who measure gas have stimulated research into its defects as a method. At the same time the use of the orifice has enormously enlarged the field of practical measurement of large volumes of gas. So with all its doubtful credentials, orifice measurement must be credited with having performed a service to the general cause. The orifice as used for this purpose has been the subject of a great deal of very thoughtful and indeed erudite investigation, perhaps the most complete treatment of the subject being found in Martins' Treatise on Chemical Engineering. Also, Davis in his Orifice for Measuring Flow goes into this subject thoroughly. But in spite of all that has been done and written on the subject of orifice measurements, the bald fact is that it is fundamentally defective as a method, for the obstruction it causes in the line is often serious, and the turbulence inseparable from flow through a hole in a plate is of such a nature as to preclude the practical possibility of dealing with this factor on a rational basis. This leaves us face to face with the necessity of determining, through empirical methods, an enormous mass of coefficients covering the full range of possible variations in ratios of orifice to pipe diameter, pressures, temperatures, specific gravities, and velocities, not to mention position of instrument connections, and the effects of pulsation. Under these conditions it is natural that the records of flow from different parts of a system or the separate records made by a number of equally reliable recording instruments should vary almost always, and sometimes to a very important degree. It is for this reason that it would seem likely that, while the orifice will be retained for the measurement of relatively small volumes of gas and at stations where the accuracy of such records may be subjected to a proper check, the most important points of measurement will employ the Venturi tube, especially where line resistance is of great importance, or where large volumes of gas are being bought or sold. In such conditions, the advantages of the Venturi tube are obviously very great, and its use at the most important measuring stations is worthy of serious consideration by the engineer concerned.

As regards the many types of instruments which have been devised for recording the differential pressures which are the measure of the velocity of flow through the orifice or the Venturi, there is reason to very strongly suspect that their accuracy is generally a good deal higher than the results to be expected after their records have been computed, as is usual on the basis of the generally used coefficients. All these instruments can do for us is to make a faithful record of the difference of fluid pressure which exists in the pipes connecting the instrument to the line, or, more accurately, the pressure in these pipes where they enter the recorder. Between this point and the connections up- and down-stream of the orifice, many conditions may exist which will affect the significance of the record, so that the correct installation of these connections is of prime importance. If a condition of severe pulsation exists in the line, here again, in spite of its best efforts, the recording mechanism may be obliged, through inertia and momentum effects, to actually record the algebraic sum of these influences—which may, indeed, vary widely from even the average of the differential pressures, not to mention the square root of these pressures. Condensate in the line may seriously interfere with the significance of the differential pressure as recorded, and is absolutely fatal to accuracy if trapped in a pocket in the meter connections. So it is that the accurate measurement of gas requires not merely an orifice and an accurate recording device, but the engineer who interprets these records must be sure that the actual significance of the data corresponds with the assumed conditions. He can only have this assurance if he understands the principles involved in this type of measurement, knows that his measuring devices are proportioned and installed as they should be, and maintained in perfect operating condition.

The difference between two pressures—which is all your record is or can be—may or may not mean a certain definite rate of flow through an orifice or contracted tube. Your measurement can be only as good as your judgment and care in the selection, installation, and maintenance of your measuring devices or instruments, and even where all else is perfect, your result will diverge from the truth in direct ratio to any error which may exist in the coefficients employed. There is a wide field for improvement in the measurement of gas, but it lies rather in the use made of the data provided by the mechanical devices employed, than in any improvement in these devices themselves.

COLEMAN'S FORMULA FOR THE FLOW OF GAS THROUGH A VENTURI TUBE

$$V_2 = \left(\frac{P_1}{Y_1}\right)^{0.5} \left(\frac{2gK}{K-1}\right)^{0.5} \left[\frac{1-\left(\frac{P_2}{P_1}\right)^{\frac{K-1}{K}}}{1-\left(\frac{A_2}{A_1}\right)^2 \left(\frac{P_2}{P_1}\right)^{\frac{2}{K}}}\right]^{0.5}$$

This reduces to,

$$V_2 = 1501\left(\frac{P_1}{P_2}\right)^{0.5} \left[\frac{1-\left(\frac{P_2}{P_1}\right)^{0.2857}}{1-\left(\frac{A_2}{A_1}\right)^2 \left(\frac{P_2}{P_1}\right)^{1.4285}}\right]^{0.5}$$

In which,

A_1 = area in square feet of up-stream end of tube.

A_2 = area in square feet of throat of tube.

P_1 = pressure in pounds per square foot up-stream.

P_2 = pressure in pounds per square foot at throat.

C = volume of gas in cubic feet per second.

$$Y_1 = \frac{1.}{C}$$

$K = 1.4$

$$\left(\frac{2g\,K}{K-1}\right)^{0.5} = 15.01$$

$$\frac{K-1}{K} = 0.2857$$

$$\frac{2}{K} = 1.4285$$

v_2 = throat velocity in feet per second.

Value of C will vary with both temperature and pressure.

Fig. 4

Pittsburgh Equitable Appoints Parker to Engineering Staff

Announcement has been made by the Pittsburgh Equitable Meter Co. of the appointment of Walter Parker as chief engineer, Liquid Meter Division. Previous to his association with this company, where he has been doing special engineering work, Mr. Parker was chief engineer of the Fry Pump Co. His long experience in designing and building meters and allied equipment for the water and petroleum industries makes him well qualified for the position.

Mr. Parker is a graduate in mechanical engineering of North Carolina State University and served with the U. S. forces during the World War.

Alco Products, Inc. Acquires Jackson Engineering Co.

Acquisition by Alco Products, Inc., of the business, good will, patents and essential personnel of the Jackson Engineering Corp. of Tulsa, Okla., on March 1, was announced. The company is engaged in the field of engineering, designing and constructing gasoline plants and equipment for the oil refining industry.

Alco Products is a division of the American Locomotive Co., headquartered in New York City, with plants at Dunkirk, N. Y. and Montreal, Can., and branch offices throughout principal cities of the country. It has been engaged for more than a year in the design and manufacture of process plants and equipment for oil refineries and completed many units in 1931.

Practically all of the personnel of the Jackson company has been retained by Alco. Gordon M. Jackson, former president has become Alco sales manager. The technical men are now in charge of design and engineering in the gasoline plant division of Alco. They are continuing under the direction of Karl Finsterbusch, former chief process engineer of the Jackson company, with Paul D. Barton as consulting engineer.

The former Jackson field engineers will continue with Alco in their former locations, with A. B. Burket in Tulsa; E. J. Hudson in Dallas; M. H. Roths in Chicago and N. M. Floyd in New York.

Other former Jackson engineers now part of the Alco staff are: H. S. Houghton, A. T. Krook, D. B. Banks, W. G. Miller, A. W. Pratt, T. E. Casselman, H. C. Trick and F. M. Gibbons.

1932 Calendar

May

Southern Gas Association—Annual convention, Monteleon Hotel, New Orleans, La., May 3-4-5, 1932.

Natural Gas Department, American Gas Association—Annual Convention, Tulsa, Okla., May 9-11, 1932.

National Fire Protection Association—Atlantic City, N. J., May 9-12.

Manufacturers Section, American Gas Association—Hotel New Yorker, New York City, May 12, 1932.

Southern California Meter Association—Los Angeles, Calif., May 26, 1932.

June

Canadian Gas Association—25th Annual Convention, Fort Garry Hotel, Winnipeg, Manitoba, Can., June 9 and 10, 1932.

July

Michigan Gas Association—Annual Convention, Grand Hotel, Mackinac Island, Mich., July 5-7, 1932.

August

Pacific Coast Gas Association—Thirty-ninth Annual Convention, Del Monte, Calif., August 23-26, 1932.

October

American Gas Association—Annual Convention, Atlantic City, N. J., October 10-14, 1932.

National Bottled Gas Association—The next meeting to be held at Atlantic City, N. J., in October, during A. G. A. sessions.

Gas and Electric Industries Prepare National Advertising Programs

BOTH gas and electric industries have plans maturing for national advertising appeals, directed at increasing residential use of their services. The electric campaign, announced a few weeks ago, is designed solely to increase electric range sales, with definite quotas set up over a three-year program. Details of the electric campaign are covered later in this account.

The appeal of the gas industry will feature gas as the ideal fuel for every household cooking, heating and cooling purpose. It will extend over a three-year period, and involves the expenditure of approximately $6,000,000 in excess of current advertising.

John A. Fry, Detroit, Mich., is chairman of the National Advertising Committee of the A. G. A. Manufacturers' Section. Present plans call for launching the gas advertising some time during the coming summer. The project has received the endorsement of the Association's executive board, according to Alexander Forward, managing director, and will be financed and directed by the National Advertising Committee of the Manufacturers' Section. Philip O. Deitsch, manager of Manufacturers' Group Activities, is secretary of the National Advertising Committee. He states that the most effective national media will be employed for the dissemination of the gas industry's educational message. A program of regional and local cooperative and tie-in advertising and promotional work with utilities and dealers handling retail sales is also a part of the campaign scheme.

A general meeting of the Manufacturers' Section has been called for Thursday, May 12, at the Hotel New Yorker, New York City, at which the National Advertising Committee will outline its plans and discuss them in detail with the membership.

Because of the interest attaching to the electric industry's coming national advertising program the American Gas Association has issued the following statement on this activity:

Preston S. Arkwright of Atlanta, Georgia, has accepted the chairmanship of the projected National Electric Cookery Council, it has been announced by the Joint Executive Committee which is representing the National Electric Light Association and the National Electrical Manufacturers Association in the preliminary organization.

Mr. Arkwright is president of the Georgia Power Co. and is a Past-President of the National Electric Light Association. He is one of the most widely known men in the utility business.

The committee has also announced the appointment of the J. Walter Thomson Co. as advertising counsel and has issued a statement defining the objectives of this activity and the progress made to date.

An outline of a proposed advertising and promotional program as submitted by the Planning Committee, of which Joseph W. Busch, of Chicago, is chairman, has been approved by the Executive Committee. Instructions have been issued to proceed with a view of having the entire program ready for operation at whatever time is deemed most suitable for its launching. In the meantime, the Council itself will be formed under Mr. Arkwright's leadership. He will be chairman also of the Executive Committee.

According to William H. Hodge, vice-chairman, considerable misunderstanding of this movement has resulted from premature and unauthorized publicity. The amount proposed to be spent in advertising and organization effort has been exaggerated, Mr. Hodge says, while statements indicating anything in the nature of a competitive attack on the gas industry are unfounded. The Executive Committee has adopted a resolution disclaiming anything in its program which will injure the gas business.

It is pointed out that there are upwards of four million household electricity users to whom gas is not available. This field offers the most attractive immediate prospects for the further development of electric cooking. The three-year plan, tentatively adopted, looks to this potential market for early results, with the gradual increase of electricity as one of the modern cooking agents in general use throughout the country.

The budget set-up includes the contemplated expenditure of $200,000 (during the first 12 months of the activity) for electric cookery advertising in magazines, with the use of from five to six times this amount in newspaper advertising and other local publicity. During the second and third years, it is expected that the national and local expenditures will be increased in line with the number of electric ranges set up as distribution quota.

The quotas set up for the three-year program are an overall total of 225,000 the first year; 325,000 the second year, and 500,000 the third year, which would mean about doubling the present number of electric ranges in use.

All funds employed for advertising in anything but local media are to be contributed by the manufacturers, leaving the intensive local effort to electrical dealers, merchants, distributors and power companies.

New Chemical Compound for Air Conditioning Announced

Discovery of a new chemical compound which tests indicate will prove an important contribution to the progress of air conditioning, was announced in April. The new compound is the result of 18 months of research conducted by the metallurgical laboratory of The Peoples Gas Light and Coke Co., under the direction of Robert G. Guthrie, chief metallurgist, and Dr. Oscar J. Wilbor, research chemist. It has been christened "lamisilite" by its discoverers, because of its laminated structure and siliceous nature.

Lamisilite, it was explained by Mr. Guthrie, has the property of removing moisture from the air rapidly and thoroughly, and can be produced at low cost. Its high efficiency, it is predicted, will make possible a reduction in size of air conditioning installations.

In its application to air-conditioning, the air, laden with dust and obnoxious odors, is drawn through a fine spray of water, where it is washed and cooled, and then passed over a bed of lamisilite, which delivers it cooled, dry, and odorless. The lamisilite is easily dried out, after it has adsorbed moisture, with an automatically controlled gas flame. According to Mr. Guthrie it will be possible to operate a small air conditioning unit, designed to serve only one room in a house or apartment, at a cost of about 2¼ cents per hour.

BUTANE - PROPANE NEWS

Covering Liquefied Petroleum Gas Service

Florida Gas Co.'s air-butane installation at Eustis, Fla., serving Eustis, Mt. Dora and Umatilla. It is estimated that the plant will care for over 1,200 consumers in the three towns at the end of the third year of its operation.

Florida's First Butane Plant

By G. B. SHEPPARD

Manager, Anderson Gas & Utilities Co., Anderson, South Carolina

THE Florida Gas Co. was incorporated in Florida in the spring of 1931, as a subsidiary of the Moody-Seagraves organization. Franchises were obtained in Eustis and two neighboring towns, Mt. Dora and Umatilla. The latter is about 4 miles north of Eustis and Mt. Dora is about the same distance southeast. The logical location of the plant was, therefore, in Eustis. Accordingly, a small plot of ground adjacent to the railroad on the edge of town was purchased for the plant site.

G. B. Sheppard

The contract for the mixing plant was let to the Gas Engineering Co., Trenton, N. J. The engineers of this company, after making a thorough study of butane plants that had already been constructed in the United States, decided to use the Cutler-Hammer automatic control. Hence, they conferred with the Cutler-Hammer engineers in Milwaukee and designed a plant which combined the advantages of several types of existing plants. A brief description of the construction and operation of the plant will serve to show this.

The liquid storage tank is a cylindrical tank with spherical heads eight feet in diameter. It is 47 feet long and will hold about 18,000 gallons of liquid butane or the contents of nearly two 10,000-gallon tank cars. Foundations were laid for two of these tanks, but only one was installed until the load could be developed. Since all butane plants have liquid storage tanks, there is nothing unusual in that.

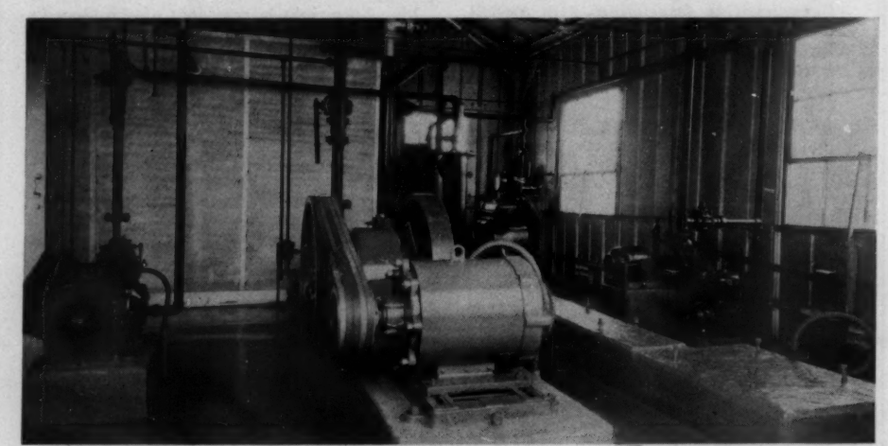
The vapor used in making the gas forces itself from the top of the tank through a 2-inch welded pipe line to the building which houses the machinery. On the wall nearest the tank is hung a 2-inch field regulator which maintains a pressure of 20 pounds on the down stream side. The pipe is then manifolded into three 1¼-inch lines each of which has a high pressure diaphragm regulator which is set to deliver the vapor at 5 pounds pressure to a differential regulator which delivers it into a 3-inch line at a pressure of 6 inches of water. These 3-inch lines are hung on the wall one above the other and far enough apart to make room for the differential regulators. Each of the 3-inch pipes is about 6 feet long, reducing to 1¼ inches. Each of these smaller lines leads into the calorimixer room through a fire proof wall. This room is located in one corner of the main building and contains the control panel, calorimixer and the butterfly valves. There are three of these valves in parallel all operated by the same motor which is controlled by the calorimixer. The 1¼-inch lines from the three differential regulators are connected to the valve nest. There is a vapor line and a butterfly valve for each of three compressors in the main part of the building.

The three vapor lines leave the butterfly valves and conduct the vapors at less than atmospheric pressure to air lines on the suction sides of the three compressors, only two of which have been installed.

The smaller of the installed compressors pumps about 3,000 cubic feet of the mixed butane vapor and air per hour directly to a 4,000-cubic foot capacity positive displacement diaphragm meter, the gas passing through a cooler and a surge tank on the way. From the surge tank, a small sample is continuously extracted and conducted through a ¼-inch pipe to the calorimixer which operates the motor operated butterfly valve to allow the proper amount of vapor to pass to the compressor to maintain the gas at 550 B.t.u. From the meter, the gas goes directly to the distribution system. A limit switch on the control panel stops the compressor when the pressure on the system reaches 12 pounds and starts it again when that pressure has dropped to 8 pounds. The switch can be adjusted to operate on different limits if it is so desired. The larger of the installed compressors pumps about 7,000 feet per hour into the storage tank, which is located beside the liquid tank. The storage tank is 10 feet in diameter and 47 feet long, built for 75 pounds working pressure. Foundations for a second tank have been installed. The large compressor is controlled by a limit switch on the control panel.

When the pressure in the storage tank drops to 60 pounds, the large compressor is automatically started. If the small compressor is running when that happens, it is immediately stopped. When the pressure in the tank reaches 75 pounds, the compressor is stopped, and if the pressure on the distribution system is below 12 pounds, the small compressor resumes its work.

The gas in the storage tank is fed into the distribution system through a regulator of the



Mixing room apparatus at the Eustis plant.

balanced valve type which is set to maintain a pressure of 8 pounds on the system. Thus, if the demand is such that the small compressor can not pump enough gas to supply it, sufficient gas from the storage is supplied by the regulator to maintain the pressure. When the supply in storage needs replenishing, the large compressor is started as described above.

It is estimated that the large compressor will not supply the peak demand when the three towns are fully developed. Foundations for a third compressor of 7,000 cubic feet per hour capacity are in. A limit switch for this one is already in place on the control panel. It will be set to start the compressor in the event that the other one allows the storage pressure to drop below 55 pounds. Both compressors will then run until the pressure reaches 65 pounds, when the newer one will then be stopped.

The compressors are connected by V-type rubber belts to fully inclosed explosion-proof electric motors with across-the-line starters, which are on the control panel in the calorimixer room.

The large compressor, also, has an after cooler and a surge tank and a sample line. The control panel takes care of switching the calorimixer to the proper sample line when the compressors are switched.

Considerable experimenting had to be done to find the proper location for the surge tanks and the check valves in the off-take lines from the compressors, but these problems were finally worked out and although the samples are taken a good many feet away from the compressors, a change in the butterfly adjustment will show in the calorimixer within 30 seconds.

The air used in making the gas is drawn in through a 4-inch line and passes through an air filter. The three suction lines to the compressors take the air from the common 4-inch intake line. There is a mixing tee in each one where the butane vapor and air come together.

The butane lines and the air line are equipped with quick opening valves operated by solenoids and gas under 10 pounds pressure. When a compressor is started the air valve and the proper butane valve are opened by the same impulse that starts the compressor.

The cooling water for the compressor jackets and after coolers is pumped by a 1½-h.p. motor driven centrifugal pump through the apparatus where it is heated to the top of cooling tower, which cools it again as it drops to the reservoir at the bottom.

From this description of the plant and its operation, it can be seen that the advantage of having a supply of gas kept automatically in storage under high pressure has been augmented by the great advantage of making the greater part of the gas and pumping it under intermediate pressure. Not only is more gas pumped by a compressor working against 8 pounds, but further the horsepower and hence the electrical energy per M.c.f. is smaller.

In compressing the butane-air mixture at 75 pounds the decrease in gas delivered amounts to about 25 per cent while the horsepower required at the belt wheel is about tripled.

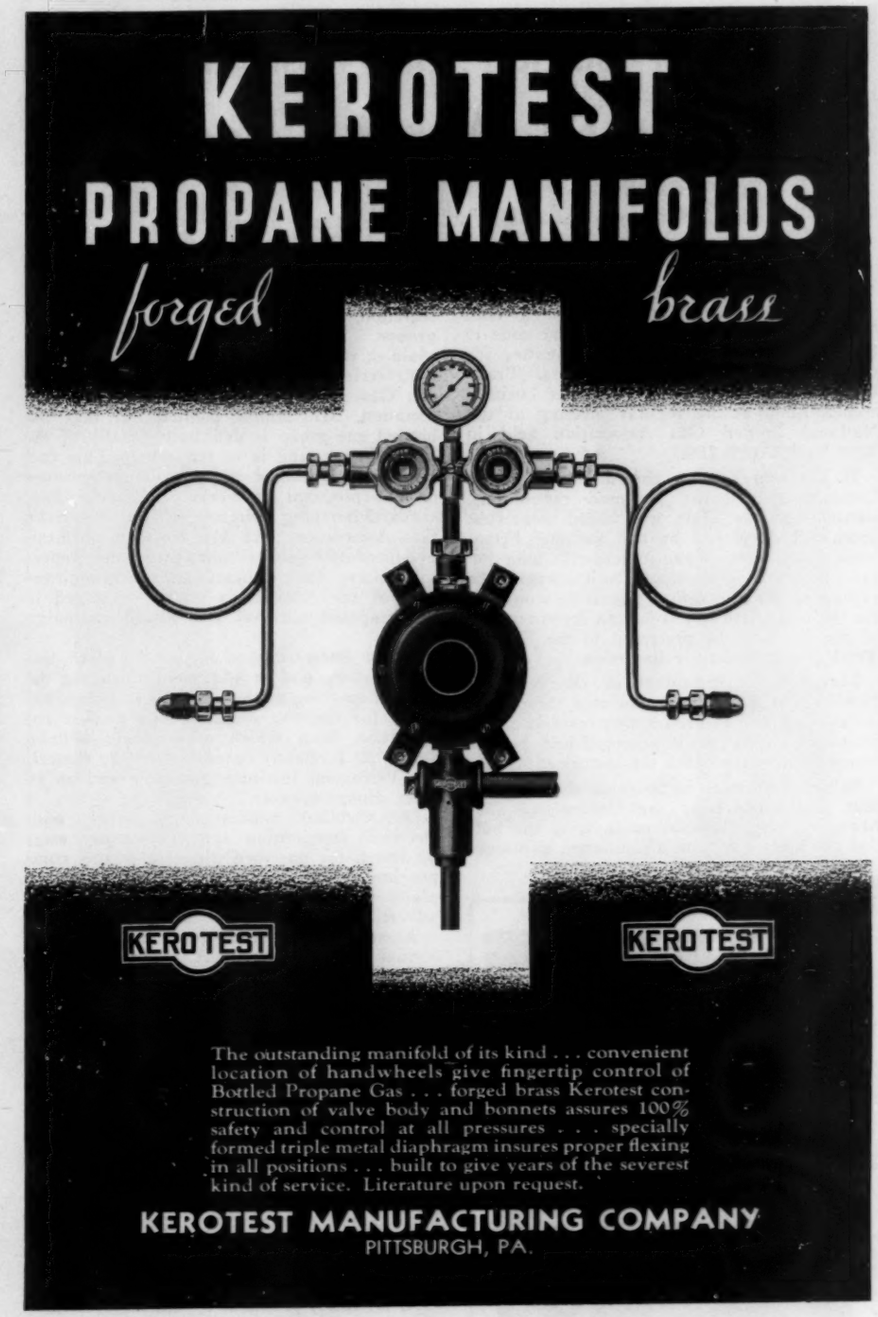
For all ordinary loads the small compressor working against intermediate pressure supplies the demand with a minimum of power. And yet, there is available at all times a supply of gas in storage which is automatically replenished if drawn upon.

The distribution system consists of a 4-inch welded steel main which serves as a transmission main, feeding the 2 inch welded network of distribution mains through balanced valve district regulators, of which there are three in Eustis and one each at the town borders of Mt. Dora and Umatilla. As stated above, the pressure on the transmission main rises and falls between the limits of 8 and 12 pounds. The district regulators maintain a constant pressure of 5 pounds on the distribution proper. Each individual service has its house regulator. The B.t.u. of the gas is kept uniform by the calorimixer and the pressure on each appliance by its individual regulator. The result is that the service is very nearly perfect. For uniformity of both gas quality and gas pressure, the people in these small Florida towns enjoy service which is generally the privilege of only the residents of large cities.

The 4-inch transmission main is reduced to 2-inch at the north end of Eustis and the 2-inch carries the gas to Umatilla. On the south side of Eustis (where the plant is located) the 4-inch main runs about ¼ mile toward Mt. Dora and is reduced to 2-inch. At the point of reduction, it is planned eventually to connect another 2-inch main to carry gas to Tavares, another nearby town.

The distribution system in Eustis and the mixing plant were ready to operate on August 15, 1931. A leaf from the natural gas man's note book was borrowed and a length of 2-inch pipe was set up vertically in the city park on the shore of the lake and connected with the transmission main. That night before a large crowd of people from Eustis and the neighboring towns, Mayor Igou of Eustis officially turned on the gas and lighted the torch by shooting a roman candle at the gas escaping from the vertical pipe. This ceremony was preceded by several short speeches by representatives of the company, including J. B. Rickman, the local manager. The long flame shooting from the torch under 10 pounds pressure was an im-

(Continued on Page 70)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The outstanding manifold of its kind . . . convenient location of handwheels give fingertip control of Bottled Propane Gas . . . forged brass Kerotest construction of valve body and bonnets assures 100% safety and control at all pressures . . . specially formed triple metal diaphragm insures proper flexing in all positions . . . built to give years of the severest kind of service. Literature upon request.
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PITTSBURGH, PA.

National Bottled Gas Assn. Adopts Tentative Marketing Code

By CRAIG ESPY

Eastern Manager, Western Gas

DISCUSSION of a proposed Code of Practices for Marketing Bottled Gas, and its adoption as a tentative code to be referred back to the Code Committee for further conference with the Federal Trade Commission, was the main piece of business accomplished at the regular meeting of the National Bottled Gas Association held in New York, April 26th.

H. Emerson Thomas, chairman of the Code Committee, read the proposed regulations, stating that the Code was based somewhat upon that developed by the National Petroleum Association. Upon its tentative adoption just before the meeting's adjournment, he explained that the future procedure would be for the committee to provide an interpretation of the Code, to be presented to the Federal Trade Commission for its action.

Mark Anton, president of the National Bottled Gas Association, officiated throughout the meeting, and in preliminary remarks called attention to the work accomplished by the board of directors since the last meeting.

In this connection he spoke of an invitation that had come from the Compressed Gas Manufacturers' Association, inviting the bottled gas men to appoint a committee to discuss with a committee of the Compressed Gas Association, the possible merging of the two groups. Such a committee, Mr. Anton explained, was to be appointed.

Referring to interest shown by the American Gas Association in the Bottled Gas Association, Mr. Anton pointed out that the bottled gas group is definitely an ally of the gas industry, and is so regarded. This fact was later explained through the appearance on the program of Major Alexander Forward, Managing Director of the American Gas Association, and Mr. Norman Griffiths, president and general manager of the Somerville Stove Co., a manufacturer committeeman of the Association actively engaged in the proposed national advertising campaign plans.

Major Forward was one of the after dinner speakers, and in addition to bringing the A.G.A. greeting to the bottled gas group, bespoke for the two organizations a close cooperation from which each would benefit. Judge A. L. Beatty, president of the American Petroleum Institute, also appeared as an after dinner speaker.

Mr. Griffiths' address dealt largely with electrical competition and cited many ways by which the gas men can combat this competition. He also outlined certain of the plans for the American Gas Association's advertising campaign.

Another feature of the program was an informal address by L. A. Belding of the General American Tank Car Company on the subject of tank cars. Illustrated slides accompanied this talk.

Mr. Anton pointed out that since the last meeting the Association had been incorporated under the laws of New Jersey. Concerning future expansion of the Association he spoke of an invitation that had come from California for a representative of the Association to visit that section for the purpose of organizing a western group of the Association. It was announced that Paul G. Ford, publicity director of the Association, would make this trip. A similar group will probably be organized in the Midwest, said Mr. Anton.

A. N. Kerr, president of the Imperial Gas Co., Long Beach, Calif., was introduced as coming the greatest distance to attend the meeting. Later Mr. Kerr proposed a motion calling for the appointment of a committee to draft a code on safety procedure to include all recommended practices in connection with the safety element in handling liquefied petroleum gas. This motion was passed.

Don G. Kelley, chairman of the committee appointed to suggest an insignia for the Association, reported the progress of his committee. A definite insignia was recommended for adoption. Richard F. Ely, secretary of the Association, reported much evidence of the interest of bottled gas men throughout the country in the association's work.

The next meeting of the organization will be held at Atlantic City in October at the time of the American Gas Association Convention.

Following is the text of the Association's tentative code of marketing practices:

CODE OF PRACTICES FOR MARKETING BOTTLED GAS

Rules pertaining to sale of liquefied petroleum gas in cylinders:

I. Definitions: For the purpose of this code, the following definitions are adopted:

a. *Consumer:* One who destroys the exchangeable value of a commodity by using it. He is an eligible buyer from bottled gas distributors or their dealers.

b. *Producer:* One who refines crude petroleum and natural gas into liquefied petroleum gas products.

c. *Distributor or Wholesaler:* One who carries a substantial stock of liquefied petroleum gas products to sell to retail dealers or others for resale, but who may also sell direct to consumers.

d. *Dealer or Agent:* One who carries a relatively small stock of liquefied petroleum gas products to sell to the consumers only.

II. Retail Gas Price Information: All bottled gas producers and/or distributors and/or dealers shall conspicuously post (furnish written statements to all subscribing members) from each point at which delivery is made, schedule of retailing prices for gas offered for sale. No seller shall make any deviation from his posted prices by means of rebates, allowances, bonuses, concessions, benefits, unusual credits or any plan, device, or other scheme which may directly or indirectly permit the retail buyer to obtain his product at a lower net cost to him. The seller shall post within 24 hours any change in his selling prices. On a change in the posted price, no adjustments, allowances, credits or refunds shall be given to any retail buyer on deliveries already made.

III. Installation Lease Charge: The installation lease charge of the equipment at less than cost as based upon a single unit comprising one cabinet, accessory, equipment and cylinders, for the purpose of injuring a competitor and with the effect of lessening competition is an unfair trade practice. Time payments may be allowed to the customer provided the same includes carrying charge, but in no case should the time payment privilege extend over a period of more than 18 months from the date of installation.

IV. Appliance Prices: The selling prices less trade-in allowances, for appliances used with liquefied petroleum gases at less than cost for the purpose of injuring a competitor and with the effect of lessening competition is an unfair trade practice.

V. Advertising: Liquefied petroleum gas advertisements and salesmen may state the advantages of the product, equipment, appliances and/or service, but shall not make negative or adverse comments with respect to the activities of the other companies engaged in the same business.

VI. Solicitation of Contract Customers: No liquefied petroleum gas producer and/or marketer shall solicit and knowingly induce, attempt to induce, a party to break an existing contract for the sale or liquefied petroleum gas products between that party and another. However, any bottled gas producer and/or marketer who unknowingly has accepted a consumer previously using bottled gas of another company, agrees to make available a record of the conditions under which the consumer was accepted.

All bottled gas above-ground equipment for installation on customer's premises shall bear in a conspicuous place the name or trade mark of the actual owner or lessor; and no producer, distributor, wholesaler or retailer shall knowingly deliver into such equipment any liquefied petroleum products other than

.Biggs. Welded Vessels

WELDED BUTANE RECEIVERS

BIGGS Welded Butane Receivers effect a real economy by eliminating the maintenance trouble and expense usually encountered under severe working conditions. The Biggs weld is ductile, uniform, and stronger than the plate itself. Data upon request.

THE BIGGS BOILER WORKS CO., Akron, Ohio

those of owner or lessor or in any way be a party to the substitution of one brand of liquefied petroleum products for another.

VII. Charging Other Parties' Cylinders: Liquefied petroleum gas cylinders shall not be filled by other than the owner, except where the written consent of the owner has been given which shall cover type of cylinders and capacities.

VIII. Servicing Other Parties' Customers: No liquefied petroleum gas producer and/or marketer shall furnish liquefied petroleum gas to any customer for use in an outfit owned by another concern.

IX. Loan of Equipment: Liquefied petroleum gas producers and/or marketers shall not permit the use of their cylinders in the retail trade of another non-affiliating company. The practice of loaning or leasing liquefied petroleum gas equipment to distributor or wholesaler is unsound and uneconomic, and should be discontinued at the earliest possible moment consistent with existing conditions.

X. Lotteries, Prizes, etc.: Lotteries, prizes, wheels of fortune, and/or other games of chance shall not be used in connection with the sale of bottled gas equipment.

XI. Selling Below Cost: The selling of liquefied petroleum gas products below cost for the purpose of injuring a competitor and with the effect of lessening competition, is an unfair trade practice.

XII. Safety Procedure: As safety procedure in connection with the handling of liquefied petroleum gas—the installation and servicing of same shall be in strict accordance with the National Bottled Gas Association code of mechanical practice and procedure.

Water Heater Campaign Completed By Natural Gas Corp. of Calif.

A successful water heater campaign was concluded recently by the Natural Gas Corp. of California, according to an announcement made by E. M. Lindsey, general manager.

This campaign covered a four weeks period, and resulted in the sale of 107 per cent of the quota assigned at the beginning of the event. The theme of hot water for "easier cleaning" was maintained throughout all of the campaign in advertising, bill inserts, etc. Salesmen averaged better than 10 water heaters per man during the four weeks period.

First prize for individual sales has been awarded to Fred Rhodes of El Centro, who sold 28 heaters, or an average of approximately one a day. Second prize goes to Clarence Josselyn of Rio Vista, who sold 18 heaters and third to John Verhall of Suisun-Fairfield for the sale of 15 heaters.

The District sales trophy was also awarded to the Suisun-Fairfield office for reaching the highest percentage of their quota during the campaign. This will be placed on display until re-won by another district. The district winning it three times will keep it.

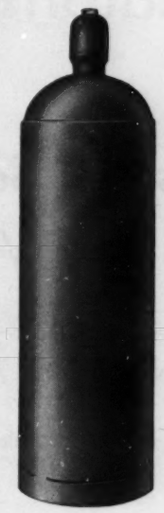
Natural Gas Corp. Announces Personnel Changes in Northwest

W. E. Meaney, who has been serving for some time as representative for Natural Gas Corp. of Washington at Port Townsend, Wash., has been transferred to the sales department of Natural Gas Corp. of Oregon at La Grande, Ore. Mr. Meaney will work with E. Mullis, who has recently been appointed representative at The Dalles.

J. B. Helgren, formerly with the service department at Port Townsend, is replacing Mr. Meaney as representative for Natural Gas Corp. of Washington there.

SCAIFE

I. C. C. CYLINDERS



A majority of distributors of Liquefied Petroleum Gas now use the Scaife cylinder.

SAFE

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GOOD LOOKING

FOUNDED 1802

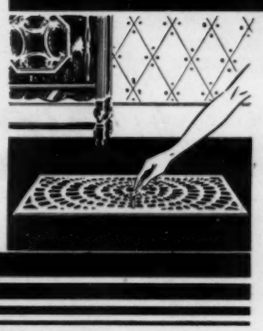
WM. B. SCAIFE & SONS Co.

Oakmont, Pa. (Pittsburgh District)

New York Pittsburgh Chicago

Electrogas

HAS OPENED A NEW FIELD



The new model 51—51,000 B.t.u. rated—has solved the problem of completely heating the average home.

"It's Matchless"

ELECTROGAS FURNACE CO.

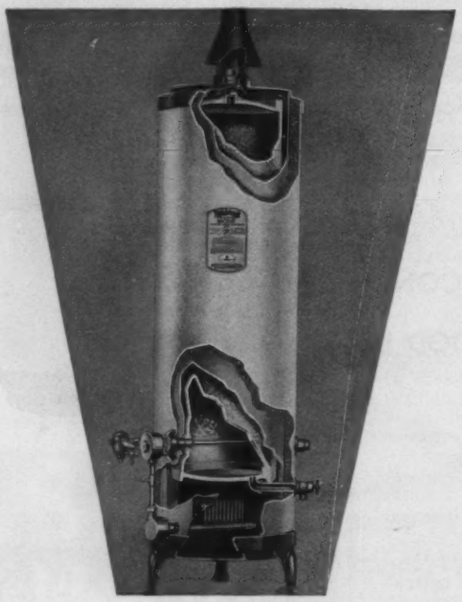
466 SUTTER STREET • SAN FRANCISCO

Announcement!

The First of a Series of New Developments

By Welsbach Laboratories

The Welsbach Automatic Burner



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Welsbach Self-Action Storage Gas Water Heaters

for

Natural or Manufactured Gas

This burner combines permanent efficiency
with
Complete Safety Shutoff
of gas to both main burner and pilots
The Safety Shutoff feature operates quickly

The Welsbach Automatic Burner
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●

Announcement of Additional Developments
By
Welsbach Laboratories
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Write or Wire

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For details or demonstration

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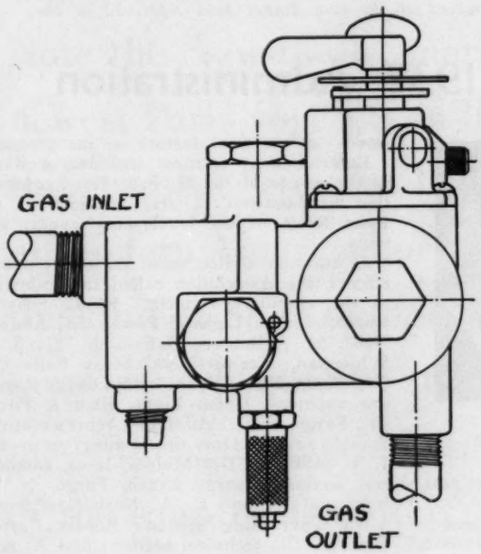
AGAIN!

We Announce a New Development

By Welsbach Laboratories

The Welsbach Multiduty Control



Patents Pending

For

Welsbach Self-Action Storage Gas Water Heaters

Incorporating in a single unit the following

TEN FEATURES

1. A Sediment Trap, to catch pipe scale, etc.
2. An Emergency Gas Shutoff, closing off gas supply if temperature of water in tank reaches 206° to 212°.
3. A Manual Reset for above, needing no parts or tools.
4. A manually operated Main Gas Valve.
5. A manually operated Pilot Gas Valve.
6. An Interlocking Arrangement of Pilot and Main Gas Valves.
7. A Pilot Gas Adjustment, independent of Pilot Gas Valve.
8. A rugged, large capacity Graduating type Thermostat.
9. A fusible plug Temperature Relief, for heaters connected with sources of heat other than gas.
10. A connection for installing a Pressure Relief Valve.

The Welsbach Multiduty Control Merits Your Special Consideration

The combination of the Welsbach Multiduty Control and Welsbach Automatic Burner constitutes complete control and safety equipment to make water heater installations 100% safe.

HOTZONE Welsbach

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and

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Gloucester City, N. J.

STAZHOT

For details or demonstration

226 So. Wabash Ave.
Chicago

Delegates to the 27th Annual Convention of the Mid-West Gas Association assembled at the stag dinner held April 12 in the St. Paul Hotel, St. Paul, Minn.

Mid-West Gas Association Elects 1933 Administration

THE 1933 convention of the Mid-West Gas Association will be held in Des Moines, Iowa, during the third week of April, according to a decision announced following the 27th Annual Convention of the Association held in St. Paul, Minn., on April 11-13. W. E. Derwent of the Geo. D. Roper Corp., Rockford, Ill., was named president for the 1932-1933 period, and will be assisted by R. L. Klar as first vice-president and C. F. Williams as second vice-president. R. B. Searing will remain in the post of secretary-treasurer.

Sessions of the 27th annual meeting were called to order on Monday, April 11, with President John K. Swanson, general manager of the Minneapolis Gas Light Co., Minneapolis, Minn., presiding, and with 133 delegates from Minnesota, Wisconsin, Iowa, Missouri, Nebraska and Illinois attending.

Program features were up to the Association's usual high standard, with the subject of dealer relations playing an important part, and reports of the Mid-West group's A.G.A. representatives featured in several sessions.

W. E. Derwent

R. L. Klar

The retiring president, John K. Swanson, gave a talk on "Let's Check Up on Ourselves" as the final feature on the program.

Entertainment features included a dance in the casino of the St. Paul Hotel, convention headquarters, a stag banquet in the Palm Room of the hotel, and several side trips.

In addition to election of the above named officers, the Association called the following to the executive council: R. L. Schacht, Iowa-Nebraska Light & Power Co., Lincoln, Neb.; M. J. Roberts, Buffalo, N. Y.; S. D. Whiteman, vice-president, Sioux Falls Gas Co., Sioux Falls, S. D., and George Lynch, gas engineer, Union Light, Heat & Power Co., Fargo, N. D. Affiliation representatives, A.G.A., elected for the coming year are: J. T. Schilling, Des Moines, Iowa, commercial section; George Lynch, Fargo, N. D., industrial section; C. A. Nash, Davenport, Iowa, advertising section; Robert Carniff, Chicago, Ill., technical section; and Al Kipples, St. Paul, Minn., accounting.

Halford Erickson, Veteran Utility Operator, Dies April 7

HALFORD ERICKSON, vice-president in charge of operation, Byllesby Engineering and Management Corp., Chicago, died at 10 o'clock Thursday morning, April 7, at his home, 426 Washington Boulevard, Oak Park, Ill.

Halford Erickson

Mr. Erickson was born July 7, 1864, in Sweden, where he received his early education. He came to the United States in 1884 and attended the university in Minneapolis, supplementing a technical education in the Swedish Military Academy and a general education with special studies in law, economics and engineering.

He entered the service of the Chicago, St. Paul, Minneapolis and Omaha Railroad in 1890, serving the company in various capacities until he was appointed commissioner of labor of Wisconsin in 1895. He held this office until 1905, when he was appointed a member of the first railroad commission of Wisconsin by Governor La Follette. In 1907, public utilities were also placed under the jurisdiction of this commission. The laws drafted by this commission, together with those formulated by the New York state commission which was appointed the same year, 1907, formed the basis for public utility regulation in all of the 47 states which have since created centralized regulatory commissions.

Because of the part he played in establishing Wisconsin law and the decisions which he largely fixed in the early stages of public utility regulation, Mr. Erickson was often referred to as the "father of state regulation." When he resigned as chairman of the commission in 1916, Mr. Erickson was the only member who had served continuously since its establishment in 1905.

In 1916 Mr. Erickson became associated with William J. Hagenah in making appraisals and other investigations of public utility properties. Headquarters of the firm of Hagenah and Erickson were in Chicago, and while associated with Mr. Hagenah, Mr. Erickson made studies of all of the larger utility companies.

Mr. Erickson joined the Byllesby organization in 1918, as vice-president of Louisville Gas and Electric Co. He served in that capacity for five years. In January, 1923, he was elected a vice-president and director of Byllesby Engineering and Management Corp., in charge of operation of all subsidiary utility properties of Standard Gas and Electric Co.

In addition to being vice-president of Byllesby Engineering and Management Corp., Mr. Erickson was vice-president, director and member of the executive committee of a number of subsidiary companies in the Standard Gas and Electric Co. system, as well as of Standard Gas and Electric Co., and H. M. Byllesby and Co.

Southern Counties Lets Contract on San Diego Line to Republic

Contract on the San Diego natural gas line was let the middle of April by Southern Counties Gas Co., Los Angeles, Calif., to Republic Steel Corp. through the Ducommon Corp. of Los Angeles. Specifications call for 68 miles of 12¾-inch O. D. electric weld pipe. Construction of the line will probably begin about May 15.

The New Style

that sets the pace for the entire gas range industry

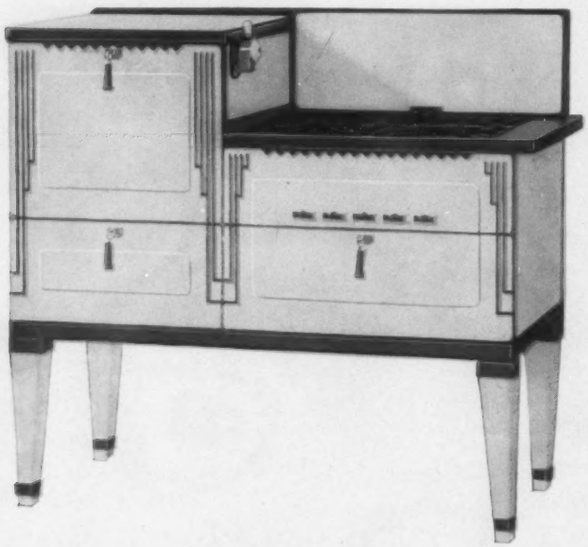
• • • Here's style that sweeps away sales resistance and opens up pocketbooks and order books . . . style that delights the ultramodern bride who is equipping her home in the newest manner . . . style that satisfies the conservative matron who wants beauty with good taste. Note the "saw-tooth" motif on the upper panels . . . a touch of the newest Paris vogue. You'll see it in the smartest spring styles. Note the graceful "stepped back" lines bordering the panels . . . a touch of modern America borrowed from our foremost architects. This is the kind of *Style that Sells,* especially when it is combined with the same superb quality and the same extraordinary value that have made this gas range a best seller throughout the length and breadth of the country. Only the trim has been changed. Value and quality remain the same. The model shown on the opposite page is the Master. It can be furnished in the green-and-ivory marbleized trim on request.

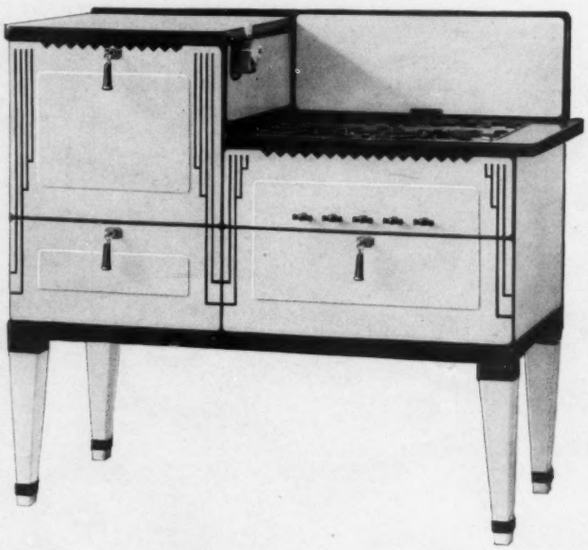
• • *Other models shown on the following page are now furnished with the new trim as standard. All can be furnished plain trim on request.*

Write for our new catalog and discounts

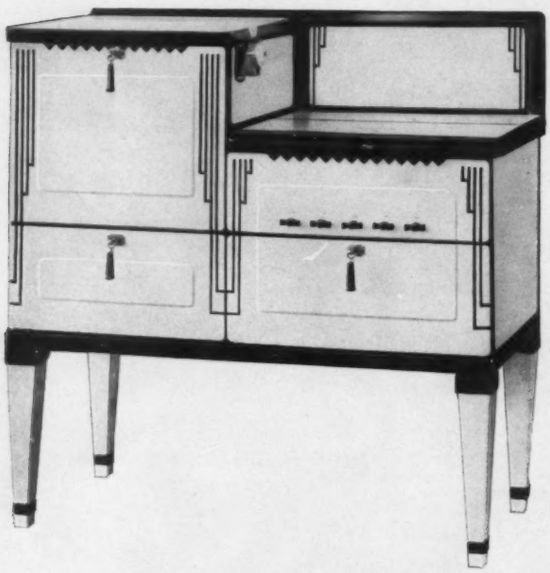
Detroit-Michigan Stove Co.

Detroit, Michigan





The Super De Luxe, furnished standard in the new style trim in ivory and green and in white and black. Furnished in plain white and black and in plain ivory and green on request



The De Luxe, furnished standard in the new style trim in white and black and in ivory and green. Furnished in plain white and black and in plain ivory and green on request. See our new catalog for complete specifications and sensational 1932 prices

Detroit-Michigan Stove Company · Detroit, Michigan

★ Today, the buyer is Queen. Everybody is competing for her dollars. She can pick and choose. She demands quality. She demands value. She gets what she wants. Right now she wants Style . . . *fresh, new, brilliant, sparkling, original Style* . . . she sees it in the flashing beauty of the newest automobiles, she sees it in the newest dress goods, furniture, furnishings . . . breath-taking beauty of line and color that captivates the eye and lures the dollars from her pocketbook. She wants Style in her kitchen equipment too . . . the same dashing, modern, up-to-the-minute Style that is turning old ideas upside down and making the vogues of yesterday look old-fashioned by comparison.

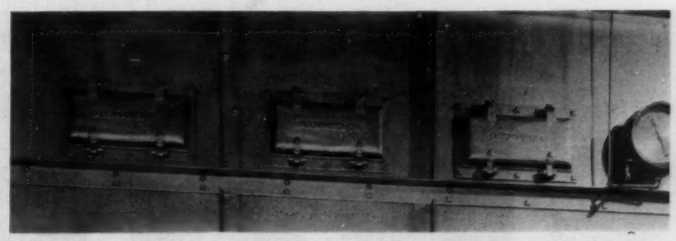
Here's the Style that sets the pace for the entire gas range industry

★ The Master

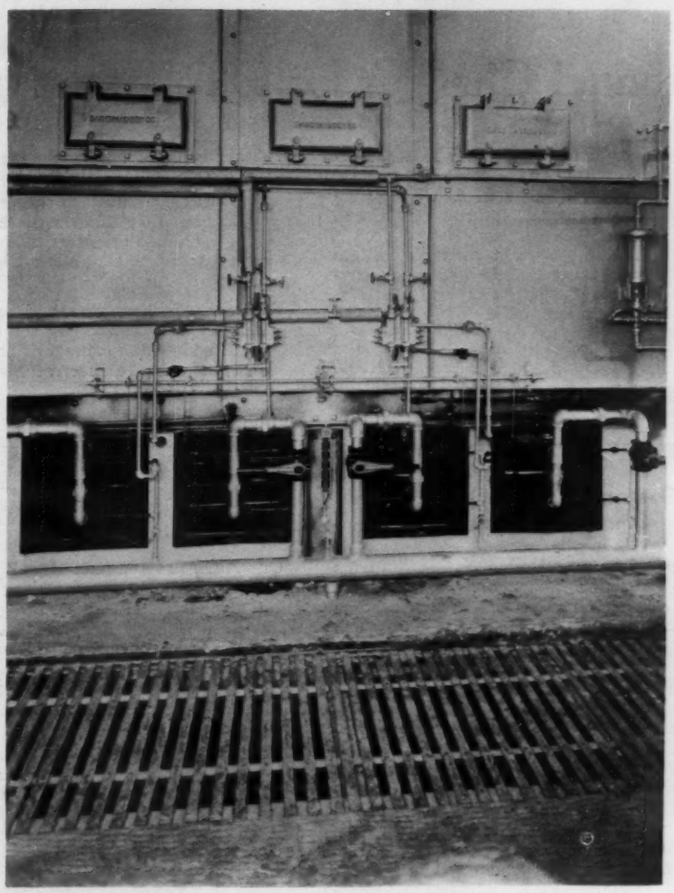
Standard equipment includes:

Robertshaw oven control.
Insta-flame automatic lighter on top burners.
Green enamel finish on burners and grates.
Complete insulation.

N.G.E.



IMPROVES ITS MOST EFFECTIVE GAS BURNER...



INSTALLATIONS exceeding a million horsepower during the last three years indicate the gas industry's preference for N. G. E. burners. The development of the Venturi tube principle of gas-air injection to its greatest efficiency in the Type A burner was a major reason for that preference.

Now, in the N. G. E. burner Type T, all the advantages of this principle are retained, and effectively combined with the desirable features of the multiple-jet principle.

The result is the most efficient and dependable burner ever designed by N. G. E. engineers. Some of its many demonstrated advantages over any other burner available are:

1. Maximum economy by insuring the combustion of the entire heat content of the fuel, with minimum excess air.

2. Universal application at high efficiency to all types of gas at all commercial pressures—0.1 inch of water to 10 pounds—and all boiler capacities from 25 h.p. to the largest sizes.

3. Readily convertible to meet any changes in service requirements—1 to 4 interchangeable units per burner and number of burners to suit capacity provide flexible installations.

4. Burner orifices adjustable without changing spuds or removing from burner.

5. Complete separation of primary and secondary air, with independent control by automatic or manual louvre adjustment.

Boiler plant of Fairmont and Mark Hopkins Hotels, San Francisco. Equipped with eight N. G. E. Type T-3 gas burners, with manual louvre control. Constant steam pressure maintained by Wilgus-N. G. E. Gas Fuel Regulator

Write for data sheet describing Type T Gas Burners . . . also a new publication covering the application of pressure regulators to gas industry requirements.

NATURAL GAS EQUIPMENT INC.

Los Angeles . . . . . Petroleum Securities Building
San Francisco . . . . . 1123 Harrison Street
Butte, Montana . . . . . Heating Assurance Inc.

Western Distributors for SURFACE COMBUSTION COMPANY ◆ WEBSTER ENGINEERING COMPANY

Milton L. Kapp

Thomas Sterling

C. Harry Sacher

J. C. Longsdorf

Personnel Changes for Oklahoma Natural

CHANGES in personnel, in which promotions were announced for three men, have been made known by E. A. Olsen, president of the Oklahoma Natural Gas Corp., Tulsa.

Milton L. Kapp, present manager of the Oklahoma City District, has been made supervisor of district operations and will be located in the general office in Tulsa. Mr. Kapp will take over duties formerly performed by B. F. Pickard, vice-president, who will be left more time to devote to other company affairs. District managers will report directly to Mr. Kapp in the future.

Thomas Sterling, now manager of the Enid District, has been named to succeed Mr. Kapp at Oklahoma City and will have as his assistant John C. Longsdorf, who was named a month ago to the Oklahoma City assistant's post.

C. Harry Sacher, who has been assistant manager of the Tulsa District under J. A. Ray, will occupy the manager's chair at Enid.

The changes were effective Monday, April 11.

L. A. Gas and Electric Corp. to File Supreme Court Appeal

An appeal to the United States Supreme Court will be filed some time this month by the Los Angeles Gas and Electric Corp. from the April 8 district court decision which called for dissolution of the injunction secured by the corporation against the California Railroad Commission's order for a 9 per cent reduction in gas rates.

The commission's order was issued in November, 1930, involving a 9 per cent reduction in the corporation's gross income, which would lower net income to a much greater degree. The corporation's application for a rehearing was denied by the commission, following which appeal was taken to the U. S. district court. The district court heard the case in January, 1931, issuing an interlocutory injunction against the rates ordered by the commission. From January of last year to date the corporation has operated under this injunction, impounding the difference between the present rate and the commission's ordered rate for refund to consumers in case the order should be sustained. To date the money impounded for this purpose amounts to approximately 1¾ million dollars. Announcement of the company's appeal to the U. S. Supreme Court is expected shortly.

Horace J. Smith Now Vice-Pres. and Treas., Ward Heater Co.

Horace J. Smith has joined the Ward Heater Co., Los Angeles, Calif., as vice-president and treasurer, and will act in the capacity of active manager in charge of all operations. For the present he will devote his time particularly to advertising and sales activities.

Mr. Smith has a background of experience in the automotive manufacturing field in both production and distribution capacities.

Insull Operating Properties In Good Shape Financially

On April 14 Samuel Insull released a statement to the press of Chicago that operating companies of the Insull group—Commonwealth Edison, Peoples Gas Light and Coke Co., and the Public Service Co. of Northern Illinois are not affected by the receivership of the Mid-West Utilities Co., the Insull Utility Investments, and the Corporation Securities Co.

The net earnings of Commonwealth Edison will be within $93,000 of what they were for the first quarter of 1931; net earnings of Peoples Gas, Light and Coke will be within $80,000 of what they were for the first quarter of 1931, and net earnings of Public Service of Northern Illinois will be $382,000 in excess of the first 1931 quarter.

It is reported in the Chicago press that a new concern, backed by new capital, will supplant the Utilities Securities Co., with the activities of the new company confined to distributing the securities of the various Insull interests. According to the report, the market activities of the Utilities Securities Co. will be discontinued, and the sale of Commonwealth Edison and other securities, which was suspended earlier in the year, will be resumed.

Reports are also current in the Illinois press that the Mid-West Utilities Co. will be reorganized during the coming weeks.

Oklahoma Natural Files Kansas Lease Agreement

Announcement has been made from Topeka Kan., that the Oklahoma Natural Gas Corp. and the Reserve Natural Gas Corp., have joined in an application asking the Public Service Commission of Kansas to approve a leasehold agreement under which the former has leased to the latter its properties in Kansas for a five-year period. In addition to its extensive production, transmission and distribution system in Oklahoma, the Oklahoma Natural Gas Corp. has for several years operated natural gas properties, including pipe lines and distributing facilities, in Allen, Anderson, Neosho, Montgomery, Linn and Wilson counties in southeastern Kansas. The company sells gas at the city gate at Chanute, Kan., and owns the gas distribution system at Erie, Kan.

Johnson-March Corp. Buys Assets of McEverlast

The Johnson-March Corp. announces the purchase of assets, patents and good-will of the McEverlast Corp. The new corporation was formed especially for this purchase and will manufacture and distribute the McEverlast line of pipe coatings and protective wrappings. Arthur A. Johnson is president of the company, G. R. March vice-president, Caryl H. Dempsey treasurer, and Edward G. Johnson secretary. Representatives are announced for the company as follows: E. J. Peck, district engineer, and C. V. Schmittou, New York; J. R. Bulger, Chicago; H. B. Mayes, Texas; D. W. Edwards, San Francisco; Carll W. Hunt, Los Angeles.

First Butane Installation in Florida

(Continued from Page 59)

pressive sight and was seen for several miles. Thus was Florida's first butane plant put into operation.

It is estimated that the total number of meters in operation in the three towns at the end of the third year will be 1,209 and that in the third year the gas sales will amount to about 21,500,000 cubic feet. Owing to financial conditions, the number of customers on the lines will be slightly below the estimate for the first six months of operation. There were, however, 200 meters in service at the end of the year 1931.

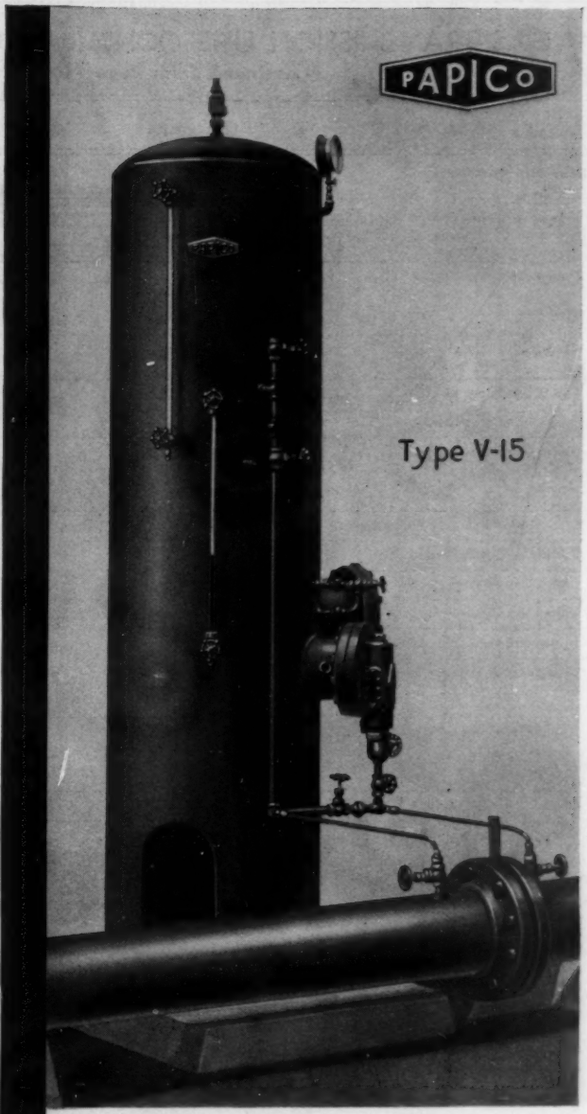
Since there is ordinarily nobody at the plant, it is necessary to have some signal system to notify the gas company employees in case something should go wrong with the gas making equipment. The only serious trouble that could arise would be from a deviation from the proper B.t.u. in the gas. The calorimixer is connected by a telephone circuit to the company's office, and also the service man's home and rings bells in both places in the event that it has opened wide the butterfly valves or completely closed them. This would mean that it can no longer control the gas-air mixture and that something is not working properly. Ordinarily the plant needs to be visited only once a day. There is a 24-hour chart on the station meter to be changed and all moving parts must be examined to see that they are in working order.

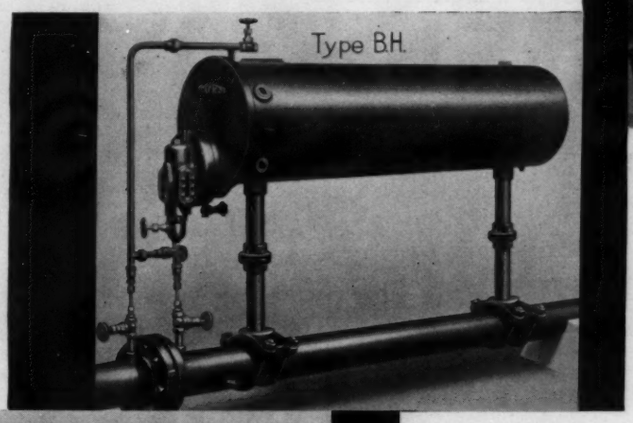
The capacity of the mixing plant, when a second gas storage tank and a third compressor and two more meters have been installed will easily take care of a peak load of 20,000 cubic feet per hour for several hours in succession. This is what it was designed to do.

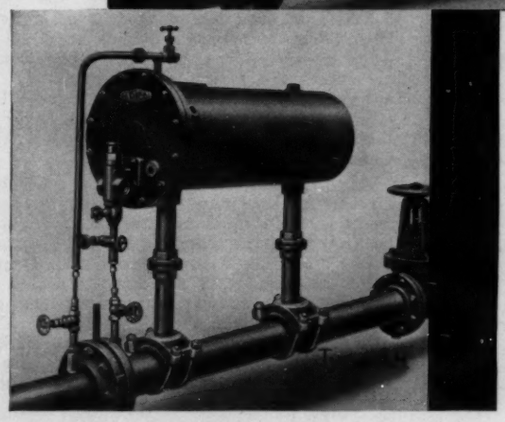
Introducing 3 improved PAPICO ODORIZERS

combining these new *features*

1. Correct size and capacity for every range of gas flow.
2. Lower cost consistent with amount of gas odorized.
3. More compact units.
4. Improved mechanical construction.
5. Neat appearance.
6. Easier installation.
7. Simplified liquid level control.
8. More positive liquid feed.
9. Combined calibration and liquid orifice housing.
10. Simplified adjustment and calibration.







Patent Pending

TYPE AH
Up to 300,000 cu. ft. per day. Maximum safe working pressure 125 lbs.

TYPE BH
Up to 1,500,000 cu. ft. per day. Maximum safe working pressure 125 lbs.

TYPE V15
Over 1,500,000 cu. ft. per day. Maximum safe working pressure 150 lbs. Type VS, for pressures over 150 lbs.

The new line of Papico Odorization equipment utilizes the same successful principle of operation that has always characterized the Papico System, embodying:

1. **Proportional injection.**
2. **Automatic shut-off at no gas flow.**
3. **Automatic flow resumption.**

The complete assemblies are thoroughly standardized, neat in appearance and most convenient to install.

Prices and engineering data will be supplied upon request.

PAPICO GAS SPECIALTIES DIVISION

PACIFIC PIPE & SUPPLY CO.

1002 Santa Fe Ave. • Los Angeles, Calif.

GAS TRANSMISSION LINE CONSTRUCTION 1931-1932

(Continued from Page 41)

Company	Line Location	Length (Miles)	Size (Inches)	Status
LOUISIANA—Continued				
United Gas Public Service Co.	Main line to Lake Charles, West Lake, Sulphur, Edgerly and Vinton	10.6 6.8 10.9	6 4 3	Completed, 1931
United Gas Public Service Co.	Laterals to Marksville, Mansura, Cottonport, Bunkie, Cheneyville, Le Compte, Oakdale, Oberlin, Elton and Kinder	68 9.4 23.4 8.2	6 4 3 2	Completed, 1931
United Gas Public Service Co.	Laterals to Welsh, Jennings and Crowley	3.1 .8	2 4	Completed, 1931
United Gas Public Service Co.	Laterals to Opelousas, Church Point and Rayne	13.2 12.1 .5	6 4 2	Completed, 1931
United Gas Public Service Co.	Laterals to Abbeville, Erath, Youngsville and Milton	4 6.3 10 .5	6 4 3 2	Completed, 1931
United Gas Public Service Co.	Lateral to Broussard	2.5	3	Completed, 1931
United Gas Public Service Co.	Lateral to Lafayette	4.5	6	Completed, 1931
United Gas Public Service Co.	Lateral to St. Martinsville	5.9	4	Completed, 1931
United Gas Public Service Co.	Lateral to New Iberia and Jeanerette	1.5	6	Completed, 1931
United Gas Public Service Co.	Lateral to Sterling Mill	1.9	6	Completed, 1931
United Gas Public Service Co.	Bogalusa to Hammond	26.2 21.7 15.9	8 6 4	Completed, 1931
United Gas Public Service Co.	Laterals to Covington, Slidell, St. Josephs Abbey, Mandeville, Independence, Hammond and and Ponchatoula	23.8 1.2 5.9 6.3	6 4 3 2	Completed, 1931
United Gas Public Service Co.	Barksdale field line	3.8	12	Completed, 1931
United Gas Public Service Co.	Jefferson Island salt mine line	6.7	6	Completed, 1931
MINNESOTA				
Northern Gas and Pipe Line Co.	Owatonna to Rochester	7 37	12 10	Completed, 1931
Northern Gas and Pipe Line Co.	Rochester line to Dodge Center	1	2	Completed, 1931
Northern Gas and Pipe Line Co.	Rochester line to Kasson	1	2	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Alden	2	2	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Wells	16	4	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to New Richland	5	2	Completed, 1931
Northern Gas and Pipe Line Co.	Main line to Albert Lea	3	6	Completed, 1931
MISSOURI				
Arrow Pipe Line Co.	Smithville to Avondale	3 20	3 5	Completed, 1931
Arrow Pipe Line Co.	Smithville to Cameron	30	5	Completed, 1931
Bourdon Pipe Line Co.	Fields near Hume to Rich Hill and Hume	12	6	Completed, 1931
Cities Service Gas Co.	Sweet Springs line to Emma, Alma and Blackburn	2	2	Completed, 1931 Cost, $6,800
Cities Service Gas Co.	Carrollton line to Norborne	8.5	3	Completed, 1931
Cities Service Gas Co.	Sedalia extension to Carrollton to Lexington and Marshall	80	8, 6, 4	Completed, 1931
Liberty Gas & Service Co.	Smithville fields to Liberty	12	6	Completed, 1931
Missouri Natural Gas Co.	Main line to Bonne Terre, etc.	15	..	Completed, 1931
Missouri Power & Light Co.	Fields near Liberty to Excelsior Springs	10	..	Under const.
Panhandle Eastern Pipe Line Co.	Boonville to Moberly	12	8	Completed, 1931
Panhandle Eastern Pipe Line Co.	Main line to Jefferson City	50	8	Completed, 1931
Panhandle Eastern Pipe Line Co.	Main line to Bowling Green	10	8	Completed, 1931
Panhandle Eastern Pipe Line Co.	Main line to Columbia	20	8	Completed, 1931
Panhandle Eastern Pipe Line Co.	Main line to Mexico	14	8	Completed, 1931
Panhandle Eastern Pipe Line Co.	Mexico to Fulton	25	..	Completed, 1931

(Continued on Page 74)

Substantial Mileage Shown in New Line Totals

(Continued from Page 41)

leased approximately 400 miles of the Stanolind oil line from Welch, Wyo. to Keystone, Neb., reconditioned it for gas, extended service to communities along its route and constructed laterals to population centers off the main line. Six Wyoming and 12 Nebraska cities and towns were added in this way to the list of natural gas communities. North Central also placed one new compressor station in operation at Casper, Wyo., to boost the gas for the reconditioned carrier.

Rocky Mountain Developments

The Rocky Mountain territory of Colorado and Wyoming remained fairly quiet during most of the year with the exception of the reconditioning job. Activities in Colorado added approximately 50 miles of gas transmission lines and brought a score of towns under the natural gas banner. In the Wyoming area, the Red Feather Oil Co. of Laramie has announced plans for building a 120-mile line from the Baggs field to Laramie, with work on the project scheduled to begin after the Spring thaw.

In Montana construction work was more active. Crews of the Montana Power Co. spanned the precipitous Rockies in 1931 with a 250-mile line from Cut Bank to Butte, Helena and Anaconda, taking the 20-inch pipe over torrential streams, up steep mountain sides and dropping it hundreds of feet into deep-walled canyons. Three rivers were crossed, one with a multiple crossing of three 12-inch lines. At some points the carrier reaches an altitude of 5,825 feet.

A second major line constructed during the year by the company originates in the Dry Creek field in south central Montana and ends 120 miles distant at Bozeman, with a score of towns along its route served with natural. Cost of the two lines was estimated at close to $11,000,000.

With completion of these two projects Montana Power Co. has distribution in 10 incorporated cities, 10 unincorporated towns, and service connections to 200 or more ranches. It is reported that eventually these two systems will be connected, making a continuous line from Cut Bank field to Dry Creek. In addition to the domestic load, the smelters of Butte, Anaconda and Deer Lodge represent a large market for natural on the Cut Bank line.

Extension of a lateral from a point near Deer Lodge to Missoula is now reported as being considered by the company. This would necessitate the laying of approximately 75 miles of pipe and the route would probably take it near the course of Hell Gate River to the foot of the Bitter Root, Mission and Cabnet mountains.

At the present time Montana gas is serving markets in three states, but persistent reports credit several companies with plans for taking natural from the state to still more distant points. At this writing, Jerome K. Drumheller of Spokane, Wash. is reported to be carrying on an active drilling program in the Cut Bank area with the object of developing a natural gas supply for the Spokane market. He is also reported taking franchises and rights-of-way along the route of the proposed

This ROBERTSHAW DISPLAY *is ready for you!*

SPEED UP YOUR GAS RANGE SALES this simple, sure way.

Write at once for the Robertshaw full color lithographed Display. As shown above, it is just the right size to place on a range or use in your window.

With this Display in use, you automatically extend an invitation to every woman coming in or near your store to have a visual demonstration of Robertshaw oven control.

It will pay you well to use this Display, for demonstrating the Robertshaw is the best way to make a woman think seriously about a new range.

And that is the kind of sales strategy you need right now. The Display is yours for the asking. Just drop us a line today.

ROBERTSHAW THERMOSTAT COMPANY
YOUNGWOOD · PENNSYLVANIA

GAS TRANSMISSION LINE CONSTRUCTION 1931-1932

(Continued from Page 72)

Company	Line Location	Length (Miles)	Size (Inches)	Status
MISSOURI—Continued				
Panhandle Eastern Pipe Line Co.	Main line to Hannibal	20	..	Completed, 1931
Panhandle Eastern Pipe Line Co.	Hannibal line to Palmyra	6	..	Under const.
Panhandle Eastern Pipe Line Co.	Main line to Laddonia and Wellsville	20	..	Completed, 1932
Panhandle Eastern Pipe Line Co.	Main line to Vandalia	5	..	Completed, 1932
MISSISSIPPI				
Public Service Corp. of Mississippi	Jackson field to Hattiesburg	90	8	Completed, 1931
Southern Gas Utilities Co.	Jackson field to Clinton	8	..	Completed, 1931
Southwestern Gas & Electric Co.	Gulfport to Biloxi	12	..	Completed, 1932
United Gas Public Service Co.	Lateral to Sanatorium	4.1	4	Completed, 1931
United Gas Public Service Co.	Jackson to Terry to Magnolia	70	6	Completed, 1931
United Gas Public Service Co.	Copiah-Lincoln School	1.2	4	Completed, 1931
United Gas Co.	Lucedale to Pascagoula	40	..	Proposed
MONTANA				
Consumers Gas Co.	Sunburst field to Sweetgrass	..	..	Completed, 1931
Gallatin Natural Gas Co.	Elk Basin field to Billings line	11.2	8	Completed, 1931 Cost, $85,000
Montana Power Co.	Dry Creek field to Bozeman	115.7	10	Completed, 1931
Montana Power Co.	Cut Bank to Morel Jct.	203.3 3.4	20 12	Completed, 1931
Montana Power Co.	Morel Junction to Anaconda	8.6	12	Completed, 1931
Montana Power Co.	Morel Junction to Butte	16.2	16	Completed, 1931
Montana Power Co.	Cut Bank gathering lines	1.8	8	Completed, 1931
Montana Power Co.	Cut Bank gathering lines	14.2	4	Completed, 1931
Montana Power Co.	Tap lines	15	10	Completed, 1931
Montana Power Co.	Miscellaneous tap lines totaling	26.7	8-1	Completed, 1931
Lewistown Natural Gas Co.	Armells field to Lewistown, Hanover, Judith Gap, Harlowtown	50	6, 4	Proposed
NEBRASKA				
Kansas Pipe Line & Gas Co.	Reconditioned oil line, leased from Standard Oil of Indiana	176.2	12	In service, 1931
Kansas Pipe Line & Gas Co.	Reconditioned oil line, leased from Standard Oil of Indiana	85.4	10	In service, 1931
Kansas Pipe Line & Gas Co.	Stanolind line to North Platte	1 5	8	Completed, 1931
Kansas Pipe Line & Gas Co.	Blue Hill and Red Cloud Jct.	5.7	4	Completed, 1931
Kansas Pipe Line & Gas Co.	Stanclind line to Ogallala	7.8	4	Completed, 1931
Kansas Pipe Line & Gas Co.	Stanolind line to Nelson, Lawrence, Brady Island, Maxwell and Keystone short laterals	8.4	2	Completed, 1931
Kansas Pipe Line & Gas Co.	Main line to Red Cloud	17	3	Completed, 1931
Kansas Pipe Line & Gas Co.	Main line to Blue Hill	.2	2	Completed, 1931
North Central Gas Co.	Reconditioned oil line, leased from Standard Oil of Indiana	110	12 10	In service, 1931
North Central Gas Co.	Stanolind line to Alliance	30	2, 4	Proposed Cost, $75,000
Nortn Central Gas Co.	Stanolind line to Sidney and Dalton	32	4 2	Proposed Cost, $75,000
Northern Gas and Pipe Line Co.	Main 24-inch line to Wymore	7	4	Completed, 1931
Northern Gas and Pipe Line Co.	Main 24-inch line to Adams	4	2	Completed, 1931
Northern Gas and Pipe Line Co.	Main 24-inch line to Palmyra	3	2	Completed, 1931
Northern Gas and Pipe Line Co.	Main 24-inch line to Weeping Water	3	2	Completed, 1931
Northern Gas and Pipe Line Co.	Main 24-inch line to Louisville	6	8	Completed, 1931
Northern Gas and Pipe Line Co.	Auburn branch line to Johnson	3	2	Completed, 1931
Northern Gas and Pipe Line Co.	Sioux City line to Ashland	7	4	Completed, 1931

(Continued on Page 76)

line. Other reports plan Montana gas for Regina and Moose Jaw, Saskatchewan, Canada, with the names of the Power Corp. of Canada, Montreal, and the Continental Public Utilities Co. of Minneapolis linked in the development. This carrier would originate in the Bowdoin field, would be 175 miles long and cost in the neighborhood of $8,000,000.

Montana Gas for Minneapolis

Looking eastward for a possible outlet for the large gas reserves of eastern Montana fields, the Great Northern Gas and Utilities Co. has applied for permission to serve gas in Minneapolis, Minn. from its wells in the Baker Glendive field, and the Poplar and Wolfpoint domes. According to information received from the company, plans at present call for a 580-mile, 24-inch line to cost approximately $20,000,000. Serving markets near the route would also necessitate construction of many additional miles of laterals. Franchising activity is progressing and surveys are being run.

Many rumors have been rampant during past months concerning other lines extending out of Montana sources into as many as four western states, but at this writing nothing to strengthen the rumors has materialized. Reports have credited pipe line companies with plans for construction of a transmission line to Seattle and on south to Portland, Ore., but there is no evidence of operations getting under way and the Seattle and Portland markets remain for the time being, a stronghold for "manufactured."

Northwestern Natural Gas Co., operating out of the Benton County fields in the Rattlesnake Hills, has carried on the only natural gas development in the district, constructing lines to serve Sunnyside, Prosser, Mabton and Grandview, an obtaining franchises in several other towns. Plans of the organization call for extending service to Walla Walla through a 40-mile line.

The California Outlook

In California, too, gas companies have been playing leading roles in the past year of pipe line construction.

Pacific Gas and Electric Co., San Francisco, and its subsidiary, the San Joaquin Light and Power Corp., added more than 100 miles of transmission line to their systems with approximately 100 miles of main line and 300 miles of connecting lines and laterals under construction or proposed at the present time. A line from Fresno to Merced accounted for about 60 additional miles in 1931 and brought activity to a large district in the San Joaquin Valley.

The most significant development by P. G. and E. is the construction, now under way, of a 45-mile, 26-inch line from Milpitas to San Francisco, augmenting the supply to that city.

Southern Fuel Co., formed by Southern California Edison Co. and Southern California Gas Co. for the purpose of serving the Edison company's electric generating plant at Long Beach and adding to the available supply for Los Angeles' metropolitan area, constructed a 210-mile, 26-inch line from Kettleman Hills to Long Beach. This line completion represented the successful solving of extremely difficult engineering problems in crossing the Tehachapi Mountains via the Ridge Route, where "unusually hard going" was the rule rather than the exception.

At this writing, the center of the California stage is occupied by Southern Counties Gas Co. and San Diego Consolidated Gas and Electric Co., with "natural" for San Diego assured for the coming winter. Preliminary work is being done, surveys run, contracts let and the San Diego system is getting ready for

Today More Than Ever Before

Competition for the diner's dollar has become unbelievably keen. The restaurants and hotels are scanning their costs. This is no time for waste, either in food or in overhead. Yet the gas range salesman with the 28-D in his kit makes this his selling talk. The 28-D, ideal as an all around range for short order and small restaurants, is a fuel saver in the big kitchens too. . . . Turn off the heavy duty ranges in off-peak hours. The 28-D will handle the stock pots, take care of the short orders, and save money on the fuel bill. The most popular number of a most popular line, it sells itself and pays its way.

George D. Roper Corp., Rockford, Ill.

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Pacific Coast Branch

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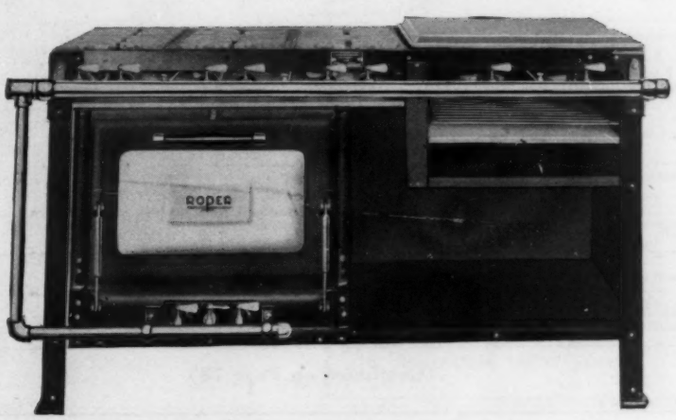
GAS RANGES



GAS TRANSMISSION LINE CONSTRUCTION 1931-1932

(Continued from Page 74)

Company	Line Location	Length (Miles)	Size (Inches)	Status
NEBRASKA—Continued				
Northern Gas and Pipe Line Co.	Sioux City line to Elkhorn	12 3	4 2	Completed, 1931
Northern Gas and Pipe Line Co.	Sioux City line to Blair	20	6	Completed, 1931
Northern Gas and Pipe Line Co.	Sioux City line to Arlington	6	2	Completed, 1931
Northern Gas and Pipe Line Co.	Sioux City line to Scribner	5	2	Completed, 1931
Northern Gas and Pipe Line Co.	Sioux City line to Tekamah	16	4	Completed, 1931
Northern Gas and Pipe Line Co.	Sioux City to Oakland	3	2	Completed, 1931
Northern Gas and Pipe Line Co.	Sioux City line to West Point	6 10	4 8	Completed, 1931
Northern Gas and Pipe Line Co.	Sioux City line to Lyons	2	2	Completed, 1931
Northern Gas and Pipe Line Co.	Sioux City line to Bancroft	3	2	Completed, 1931
Northern Gas and Pipe Line Co.	Sioux City line to Wayne	13 14	4 6	Completed, 1931
Northern Gas and Pipe Line Co.	Sioux City line to Pender	8	4	Completed, 1931
Northern Gas and Pipe Line Co.	Sioux City line to Emerson	2	2	Completed, 1931
Northern Gas and Pipe Line Co.	Sioux City line to Wakefield	2	2	Completed, 1931
Northern Gas and Pipe Line Co.	Plattsmouth to Omaha	16	18	Completed, 1932
Northern Gas and Pipe Line Co.	David City to Schuyler	14	4	Under const.
Northern Gas and Pipe Line Co.	Schuyler to Columbus	15	8	Under const.
NEW MEXICO				
Southern Union Gas Co.	Santa Fe line to Las Vegas	65	8	Proposed
Southern Union Gas Co.	Main line to Bernalillo	2	6	Completed, 1931
NORTH DAKOTA				
Minnesota Northern Power Co.	Marmarth to Bowman	32	6	Completed, 1931
Minnesota Northern Power Co.	Bowman to Hettinger	20	6	Proposed
Minnesota Northern Power Co.	Williston to Minot	110	12 10	Proposed
OKLAHOMA				
Braman Oil Co.	Field to Choteau and La Pryor	35	..	Completed, 1931
Central States Light & Power Co.	Holdenville to Portland Cement plant	20	8	Completed, 1931
Cimarron Utilities Co.	Oklahoma state line to Boise City	22	5½	Completed, 1931 Cost, $59,400
Independent Engineering Co.	Bebee field to Stratford	12	..	Completed, 1932
Junior Gas Co.	Poteau to Heavener and Howe	14	..	Completed, 1931
H. G. Newcomb	Canadian to Indiaola	7	2, 3	Completed, 1931 Cost, $10,000
Oklahoma Natural Gas Corp.	Muskogee county to Chickasha field	1.7	4	Completed, 1931 Cost, $6,500
Oklahoma Natural Gas Corp.	Various small projects totaling	20	8, 6, 4, 2	Proposed Cost, $75,000
Oklahoma Utilities Co.	Miscellaneous short lines totaling	3	6, 2	Completed, 1931 Cost, $11,800
Pact Gas Co.	Main line extension to Perkins, Coyle and Langston	25	..	Completed, 1931
Public Service Co. of Oklahoma	Miscellaneous short lines totaling	1.3	8, 6	Completed, 1931 Cost, $11,138
State Fuel Supply Co.	Field to Laverne	7.8	4	Completed, 1931
State Fuel Supply Co.	Laverne to Buffalo	11.3	4	Completed, 1931
Western Service Corp.	Oklahoma City field to Guthrie	50	8	Completed, 1931 Cost, $227,000
Winchester Oil & Gas Co.	Medicine Lodge line to Carmen, Dacoma and Aline	30	..	Completed, 1931
OREGON				
*Portland Gas and Coke Co.	Main line to Newberg	12	6	Completed, 1931
*Portland Gas and Coke Co.	Newberg to McMinnville, etc.	10	..	Proposed

*Manufactured gas transmission line.

(Continued on Page 78)

the usual change-over operations. Southern Counties Gas Co. will construct 68 miles of 12¾-inch line from Huntington Beach to Rose Canyon, near San Diego. From there San Diego Consolidated crews will build seven miles of 12-inch to tie the Southern Counties line in with the San Diego system.

The San Diego market has an established load of more than 2,500,000 M.c.f. through 57,000 meters. It includes a score or more of towns and extends to San Ysidro, U. S. port of entry on the Mexican border.

Reviewing gas transmission line construction in 1931 and observing the trends of the past few years in pipe line building, it seems not unlikely that before many more construction seasons have passed, the natural gas pipe liner, like Alexander of old, will be "looking for new worlds to conquer." Certain it is that laterals from existing main lines, and the definite program established for new line laying in ensuing months, will keep the industry in the forefront of current industrial activity.

Aitken Named Sales Engineer For Neilan Co., Ltd.

Neilan Co., Ltd., manufacturer of automatic regulating and control instruments, announces the appointment of M. N. Aitken as sales engineer in charge of the sale of Neilan equipment to the natural and manufactured gas industry exclusively. Mr. Aitken received his training as a control engineer with the Neilan organization.

A new line of Neilan rate-of-flow controllers and flow meters has been added to the line of Neilan regulators for the gas industry.

Hodge and Willien, Byllesby Executives, on Pacific Coast in April

W. H. Hodge, vice-president in charge of advertising and sales, and Leon J. Willien, operating gas engineer, both of the Byllesby Engineering and Management Corp., arrived in San Diego early last month to confer with San Diego Consolidated Gas and Electric Co. executives relative to the coming introduction of natural gas into San Diego. Mr. Hodge planned to return to his company headquarters at Chicago about May 1, by way of the Pacific Northwest where he was to visit other Byllesby units. Mr. Willen was to remain in San Diego for two or three weeks before returning to Chicago.

Northern Gas and Pipe Line Co. Asks Permit to Build Iowa Line

Northern Gas and Pipe Line Co., Omaha, Neb., has filed an application for permission to construct a gas transmission line, approximately 10 miles long, to serve Forest City, Iowa with natural. The line would leave the company's main line in Worth county and extend westward to the town. If the permit is granted, service is expected to begin about June 1.

Shallenberger Gets Talihina, Okla., Franchise; Service for September

H. A. Shallengerger was granted a 25-year gas franchise by citizens of Talihina, Okla., in a special election April 11. Mr. Shallenberger intends to construct a gas distribution system in Talihina, which he hopes to have completed in September, securing gas from the local field.

Franchise at Vegreville Transferred

Vegreville Utilities Ltd., now holds the gas franchise granted to the Vegreville Natural Gas Co., Vegreville, Alberta, Canada. Date for beginning service has not been announced.

300,000 BUYERS* CAN'T BE WRONG!

—And three hundred thousand home owners throughout the United States have signified their preference for Ward quality by purchasing Ward Furnaces—than which there is no better endorsement!

But this nation-wide acceptance has been won on merit alone, for Ward represents the ultimate in floor furnaces. There are, of course, cheaper floor furnaces than Ward, but there can be none better. Ward construction is of the highest quality throughout, proven by the fact that more material per B.T.U. goes into a Ward Furnace than any other heater of this type on the market.

Write for complete information about the Ward franchise for dealers.

**Incidentally, every one of these sales made a satisfactory profit for some utility company or dealer.*

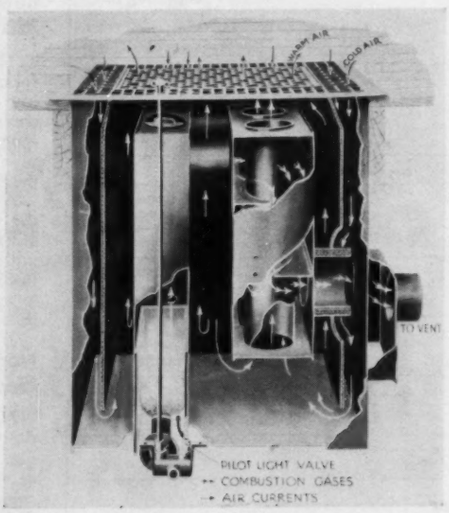
WARD HEATER COMPANY

"The oldest and largest floor furnace manufacturers in the world"

1800 W. Washington Boulevard

Los Angeles, California

Telephone: PArkway 9171



16 WARD ADVANTAGES

1. Heats every corner of the room evenly by natural circulation.
2. Requires no basement; can be installed in any home, church or public building.
3. Eliminates the "cold zone" at the floor line because every bit of air in the room is thoroughly and evenly heated.
4. No delicate parts to break or get out of order.
5. Easily regulated to give just the degree of heat you want—when you want it.
6. Keeps your home well ventilated by circulating the heat throughout the rooms.
7. Approved by the American Gas Association.
8. Curtains and draperies are not soiled by collecting soot and dust.
9. Takes no moisture from the air in the room—adds no moisture to it.
10. Unnecessary to get close to the furnace to get warm, as heat circulates to every corner of the room.
11. Assures dry walls and windows all winter.
12. Hot air does not rise to ceiling and stay there, but is kept in constant circulation. Your feet are kept warm.
13. Can be installed in less than half a day.
14. Takes up no space in the home. A handsome, polished register is all that you see.
15. All Ward Furnaces are constructed from heavy-gauge Toncan rust-resisting iron.
16. Guaranteed for 10 years.

GAS TRANSMISSION LINE CONSTRUCTION 1931-1932

(Continued from Page 76)

Company	Line Location	Length (Miles)	Size (Inches)	Status
SOUTH DAKOTA				
Northern Gas and Pipe Line Co.	Sioux Falls line to Yankton	40	..	Proposed
Northern Gas and Pipe Line Co.	Sioux Falls line to Lennox and Worthing	10	..	Proposed
Northern Gas and Pipe Line Co.	Sioux Falls line to Centerville	15	..	Proposed
TENNESSEE				
Memphis Natural Gas Co.	Memphis to Ripley	60	10	Completed, 1931
Memphis Natural Gas Co.	Ripley to Jackson	40	8	Completed, 1931
Memphis Natural Gas Co.	Jackson to Humboldt	12	6	Completed, 1931
Missouri Kansas Pipe Line Co.	Russellville, Ky., fields to Nashville	50	8	Proposed
TEXAS				
Big Bend Pipe Line Co.	Pecos county field to Fort Stockton	24	8	Completed, 1931
Big Bend Pipe Line Co.	Fort Stockton to Alpine and Marfa	80	4	Proposed
Cities Service Gas Co.	Gathering lines in Pampa field	3.5 2.5	4 6	Completed, 1931 Cost, $13,400 Completed, 1931 Cost, $16,000
Houston Oil Co.	Main line to Dickinson	4 1.6	6, 4 2	Completed, 1932
Independent Engineering Co.	Gray county fields to Wellington, Memphis, etc.	50	8	Proposed
Lone Star Gas Co.	Main line to Leeray field	2.8	10	Completed, 1931
Lone Star Gas Co.	Main line to Strawn field	2.1 1.1 2.8	12 10 8	Completed, 1932
Lone Star Gas Co.	Main line to Caddo field	1.2	4	Completed, 1931
Lone Star Gas Co.	Compressor station to Brad field	2.2	2	Completed, 1931
Lone Star Gas Co.	Main line to Herron City field	2.8	6	Completed, 1931
Northern Gas and Pipe Line Co.	Gathering system in Saxet field	150	..	Completed, 1931 Cost, $2,000,000
Panhandle Power & Light Co.	Dumas to Stratford	34.5	6⅝	Completed, 1931 Cost, $107,225
Panhandle Power & Light Co.	Stratford, Texas to Boise City, Okla.	36.7	5½	Completed, 1931 Cost, $92,914
Rio Grande Valley Gas Co.	Mercedes to Rio Grande River	6.7	3	Completed, 1931 Cost, $25,000
Shamrock Oil and Gas Co.	Amarillo field to Fort Worth	200	..	Proposed
Texas Electric Service Co.	Present line to Leon generating station	18	8	Completed, 1932
Texas Public Service Co.	Big Lake field to San Angelo	80	12	Completed, 1931
Texas Public Service Co.	Big Lake field to Girvin Power plant	40	8	Completed, 1931
United Gas Public Service Co.	Buda to Hallettsville	21.8 4.8 2.9 51.5 16.4	12 10 8 6 4	Completed, 1931
United Gas Public Service Co.	Lines to Weimar, La Grange, Smithville, Schulenburg and Butler	8.1 8.6 6	6 4 3	Completed, 1931
United Gas Public Service Co.	Line to Buda	2.4	2	
United Gas Public Service Co.	Kelly and Duncan fields, and Camp Normoyle	1.5 1.5	6 4	Completed, 1931
United Gas Public Service Co.	Laterals to Saratoga and Shepard	3	2	Completed, 1931
United Gas Public Service Co.	Lateral to Odem	5.6	2	Completed, 1931
United Gas Public Service Co.	Lateral to Tenaha	7	2	Completed, 1931
United Gas Public Service Co.	Lateral to Joaquin	3	4	Completed, 1931
United Gas Public Service Co.	Lateral to Arp	2.2	4	Completed, 1931
United Gas Public Service Co.	Lateral to Corrigan	1.2	2	Completed, 1931
United Gas Corp.	Austin to Wichita Falls	240	..	Proposed
United Gas Corp.	Proposed Wichita Falls line to Forth Worth	60	..	Proposed

(Continued on Page 80)

Winters Named Vice-President Of Atlanta Gas Light Co.

ANNOUNCEMENT has been made of election of Willard W. Winter, formerly of Mobile, Ala., as vice-president and general manager of the Atlanta Gas Light Co., Atlanta, Ga., by Colonel Albert E. Pierce, president of the Central Public Service Corp., of which the Atlanta company is a subsidiary.

W. W. Winter

J. W. Gates, for the past two years general manager of the Atlanta Gas Light Co., has been appointed divisional manager for the group of affiliated utilities of the Central Public Service system located in the states of Alabama, Florida and Texas. Both Mr. Winter and Mr. Gates will assume their new duties immediately.

In addition to his duties with the Atlanta Gas Light Co., Mr. Winter will act as chief executive in coordinating the general policies and management functions of all the Central Public Service utility properties in the Southeast, serving approximately 40 cities, located from Charleston, S. C., to Port Arthur, Texas.

Mr. Winter's appointment as chief executive of this important group of utilities follows an extensive career in utility management in various sections of the country. He began his career with the Dawes properties in Little Rock, Ark., from which he was appointed assistant manager of the Mobile Gas Co. Following this experience he was appointed comptroller of the Southern Gas and Power Corp. of Philadelphia. When this company became a part of the Central Public Service system, Mr. Winter was transferred to the general offices of the corporation in Chicago.

Upon the purchase of the Atlanta Gas Light Co. and other Southern properties by the Central Public Service Corp. approximately three years ago, Mr. Winter went to Atlanta, in charge of the accounting for the group, and was active in the transfer of the management to the new owners. This having been completed, he was appointed divisional manager of the western group of the southern properties of the corporation, where he served until his present appointment, and in which duties Mr. Gates will succeed him.

Birmingham Conference Draws 250 Distribution Men

The 9th annual A.G.A. Distribution Conference was held in Birmingham, Ala., bringing 250 distribution engineers together in the three-day meetings—April 6, 7, 8. An inspection trip through Birmingham's cast-iron pipe foundries on the second day supplemented the excellent program.

As a result of discussion on progress of the research program being conducted by the U. S. Bureau of Standards on pipe coatings and corrosion, the conference passed a resolution urging the A.G.A. executive board to appropriate $6,000 to continue the research through 1933.

Norman Thomas to Manage Macon Gas Co. for Central Public Service

Norman Thomas, formerly manager for the Georgia Public Utilities Corp., at Athens, Ga., has been transferred to the managership of the Macon Gas Co. at Macon, Ga. Both companies are units of the Southern Cities Public Service Co. Guy T. Henry takes Mr. Thomas' post at Athens.

To Sales Managers

who can use more help in making 1932 Gas Appliance quotas

With the year almost half gone, 1932 quotas are looming larger and larger. We all realize now that we have a stiff job ahead, even if all the anticipated improvement materializes.

But team-work will put the job over. And, as Merchandise Manager of the Pacific Gas Radiator Company, I'd like to talk to you, about the team-work offered by the oldest and largest manufacturer of gas-heating equipment on the Pacific Coast.

To begin with, Pacific Gas is responsible. That is an important requirement in any institution that you tie in with on a merchandising program. Pacific Gas dates from 1913; it is substantial, amply financed, ably administered, with a sales volume during the last decade ranging up to a million dollars per annum.

Second, Pacific Gas makes a complete line which covers your entire field . . . industrial, commercial, and domestic space heating of every type; water heating, *everything*.(*)

Third, there are nineteen years' experience back of Pacific Gas heating appliances. They carry the AGA Blue Seal; they are covered by our own unusually sweeping guarantee. In engineering design, in construction, in quality of materials, and in guaranteed service, they are the type of appliances that *you* will be willing to stand back of.

Fourth, (and this is particularly important right now) *they are priced right.* By that I mean that after putting all the quality that experience and expert engineering can build into our appliances, we can still price our equipment on a competitive basis because of volume economies.

We still have some open territory. We have an interesting proposition for anyone who is interested in appliance sales or load-building. We have gas heating equipment that makes faithful friends for all forms of gas . . . Natural, Artificial, Liquid Petroleum and Air-Butane. We are strongest in lines where saturation is least and potentialities greatest.

I'd like to talk the situation over with you, just as one merchandiser to another. Will you write me, personally, please?

C. O. MENIG,
Sales Manager.

Pacific Gas Radiator Company

Manufacturer of Every Type of Gas Heating Appliance

Roseberry at Walter Street
Huntington Park, California

*The Pacific Gas Line includes: Pressure-type Furnaces . . . Unit Furnaces . . . Gas Unit Heaters . . . Floor and Dual Furnaces . . . Gas-Steam Radiators . . . Gas Radiators . . . Wall Heaters . . . Radiant Heaters . . . Water Heaters. All are adapted to any type of gas . . . Natural, Artificial, Liquid Petroleum. Air Butane.

GAS TRANSMISSION LINE CONSTRUCTION 1931-1932

(Continued from Page 78)

Company	Line Location	Length (Miles)	Size (Inches)	Status
UTAH				
Wasatch Gas Co.	Sandy Junction to Pleasant Grove	26.5	6⅝	Completed, 1931 Cost, $225,000
Western Public Service Corp.	Provo to Ironton	2.6	16	Completed, 1931 Cost, $40,049
Western Public Service Corp.	Ironton to Springville	2.7	8	Completed, 1931 Cost, $25,050
Western Public Service Corp.	Springville to Spanish Fork	4.7	6	Completed, 1931 Cost, $32,103
Western Public Service Corp.	Ogden to Pocatello	100+	..	Proposed
WASHINGTON				
Northwestern Natural Gas Co.	Field to Grandview	26	6	Completed, 1931
Northwestern Natural Gas Co.	Grandview to Sunnyside	10	4	Completed, 1931
Northwestern Natural Gas Co.	Main line to Prosser	5	4	Completed, 1931
Northwestern Natural Gas Co.	Main line to Mabton	4.5	3	Completed, 1931
Northwestern Natural Gas Co.	Benton County to Pasco, Kennewick and Walla Walla	50	8 and 6	Proposed
*Seattle Gas Co.	Seattle to Kent	13.8 22.5	4 2	Completed, 1931 Cost, $82,000
*Seattle Gas Co.	Kent to East Hill Highway	2	2	Completed, 1931 Cost, $3,500
*Washington Gas & Electric Co.	Everett to Snohomish (Reconditioned)	5.1	4	In service, 1931 Cost, $3,500
*Manufactured gas transmission line.				
WYOMING				
Frannie Gas Co.	Field to Frannie	6	2	Completed, 1931
North Central Gas Co.	Leased from Standard Oil of Indiana	150 (apr.)	12 10	In service, 1931
North Central Gas Co.	From Glenrock to Clayton Tank Farm	10	10	Completed, 1931
North Central Gas Co.	Guernsey to Wheatland	19	4	Completed, 1931
Red Feather Oil Co.	Baggs field to Laramie	125	8	Proposed
Rocky Mountain Gas Co.	Buffalo Basin field to Meteetse	9	..	Completed, 1931
Wyoming Gas Co.	Worland to State Industrial School	6	3	Completed, 1931 Cost, $15,000

Merchandising Trends of 1931-1932

(Continued from Page 50)

ample of Kansas at their door, are awake; they intend that the public shall know the facts behind any further legislative attempts which may be made in their state. The Missouri association has been very active in furthering company-dealer cooperation, a field representative being employed to travel the state in this work.

Many instances are now arising where dealer interests are opposing legislation to ban utility selling. The National Association of Master Plumbers has officially approved the American Gas Association's set of merchandising principles and reports general interest among its membership in working with gas companies to build plumbers' appliance sales. In the recent defeat of the Mississippi bill upwards of a thousand letters were submitted to the legislature opposing its enactment, and a good share of them were from merchants. A few weeks ago the electrical contractor-dealers of Southern Minnesota, in convention assembled, went on record against legislation adverse to utility merchandising.

Where the Press Stands

The pronounced attitude which newspapers have assumed against the Kansas-Oklahoma legislation, and against attempts to introduce it elsewhere, has brought the issue into the open in the past few weeks. Both public and dealers are now reading facts on the vicious effects of these laws, and upon the benefits resulting from utility sales and service—to counterbalance the misstatements of interests which have been agitating for this legislation.

Newspaper opinion in Kansas, judged by expressions of individual papers and also by official resolution of the Kansas Press Association, is wholeheartedly opposed to the Kansas law and urgent in demand for its repeal. On January 17 of this year the Kansas Press Association voiced its feelings in these words:

> "On the grounds that it is depriving cities and towns of adequate service and contributing to empty store rooms and unemployment, we urge the repeal by the next legislature of the law known as the utility merchandising act."

A poll of the newspaper men present at the above convention brought response from representatives of 68 papers—67 condemning the law, 1 favoring it.

Aside from the interest of the public which it serves, the press is immediately concerned with the effects of this legislation, for when the utility stops selling, its advertising is largely limited to institutional messages, and drops to a fraction of its former volume. In both the Kansas and Oklahoma experiences, it is impossible to offset decreased utility advertising with increased dealer advertising. Appliance advertising loss thus far in Kansas is estimated at above $300,000. Newspapers in Oklahoma also show marked drop in appliance lineage. Figures developed by the Texas Press Association to show what would happen if a similar law were passed in Texas, indicated an annual expenditure of $1,250,000 in utility advertising of 1931, in which appliance advertising predominated. In Pennsylvania a similar estimate expresses the opinion that "if a law forbidding utilities from merchandising appliances in Pennsylvania should be enacted, newspapers would lose perhaps $400,000 worth of advertising from clients who always pay their bills promptly."

Though naturally concerned over loss in its own income the press is equally mindful of the public's interests in opposing the restrictive legislation. Scores of press comments are referring to the Kansas-Oklahoma experiment, pointing out that under this legislation the public loses service on appliances, that installment buying is not available in many cases, that business is going to mail order houses, that unemployment and curtailed business activity along with lessened advertising means less money in home circulation.

The Eric (Okla.) Democrat sums up the attitude of both Kansas and Oklahoma press in a recent comment. After reporting word of some 800 jobs lost in Oklahoma when its law went into force, and deploring store vacancies and tax losses, the item concluded:

> "Oklahoma newspapers should follow the lead of their Kansas brethren of the press in getting rid of this law as they will do in Kansas."

The Republican Editorial Association of Missouri recently put itself officially on record as "unalterably opposed to the enactment in Missouri of a law similar to the ones in Kansas and Oklahoma known as the 'utilities merchandising act'; the experience in those states being that the operation of such laws has been a detriment rather than a benefit to the communities there."

Similar action was taken in March by the Ozark Press Association, representing the press in 22 counties of southwest Missouri.

Communications to *Western Gas* from nearly a score of state and regional press associations show the sentiment of these organizations and their member newspapers to be unmistakably against anti-merchandising laws. The following excerpt from a letter received from the Iowa Press Association is typical:

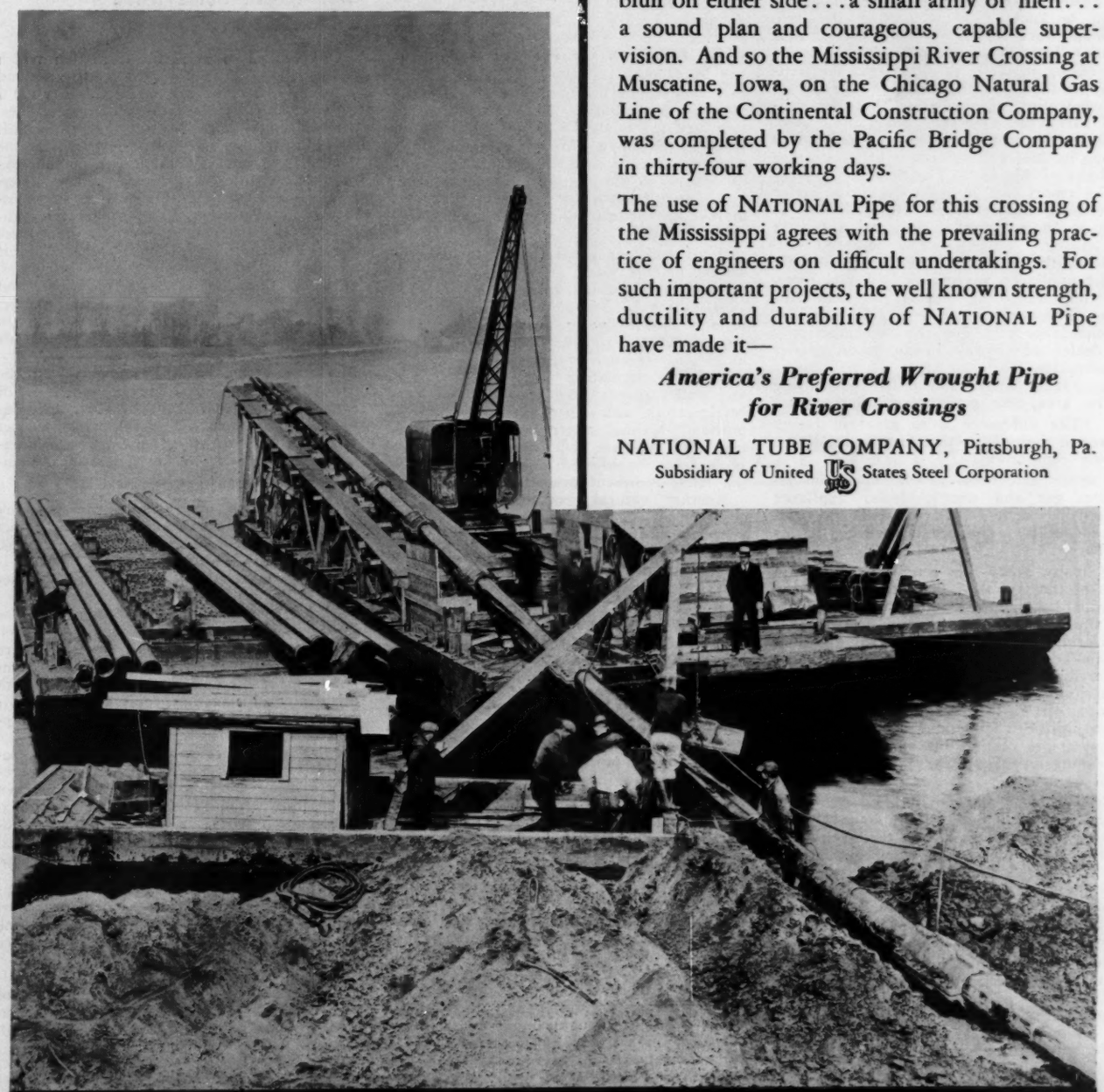
Why good time was made in laying this MISSISSIPPI CROSSING

A dredge . . . several launches . . . three barges . . . about 2400 feet of 12-inch NATIONAL Pipe for each of six lines reaching from shore to shore . . . suitable river clamps for welded joints . . . valves and headers to gather together the six 12-inch pipes at each end, terminating in two 18-inch lines . . . enough 18-inch NATIONAL Pipe to extend, double, from the water's edge to the bluff on either side . . . a small army of men . . . a sound plan and courageous, capable supervision. And so the Mississippi River Crossing at Muscatine, Iowa, on the Chicago Natural Gas Line of the Continental Construction Company, was completed by the Pacific Bridge Company in thirty-four working days.

The use of NATIONAL Pipe for this crossing of the Mississippi agrees with the prevailing practice of engineers on difficult undertakings. For such important projects, the well known strength, ductility and durability of NATIONAL Pipe have made it—

America's Preferred Wrought Pipe for River Crossings

NATIONAL TUBE COMPANY, Pittsburgh, Pa.
Subsidiary of United States Steel Corporation



NATIONAL PIPE

"We shall stand against any movement calculated to prevent utility companies from merchandising their appliances, especially those intending to build up their services and create a greater use for their products. We are against the state entering into the matter in any direction which will hinder the operation of or prevent the development of utility companies and other private business concerns."

Tangible Evidence of Utility Market-Building

By checking the amount of appliance advertising done by utilities against that done by dealers, the newspapers are in a position to know who is putting the promotional work behind appliance sales. Few utilities have kept records of the dealer advertising in their territories, but the testimony of those who have done so bears out the contention of the press that the utilities carry the appliance advertising load. A limited inquiry conducted by *Western Gas* among utilities and publishers brings further evidence of this fact. The majority of companies report that in their territories dealer advertising ranges from "negligible" to as high as 30 per cent of the total appliance advertising. There are of course exceptions to this rule, in large centers where dealer appliance advertising is a real force, sometimes exceeding that of the local utilities. One company showed this condition in one large city, but reported practically no dealer advertising in its many smaller communities.

Comparing dealer and utility advertising in its area, one press association says:

> "The difference is so great in favor of the utilities that there is hardly any comparison."

Another state press association official estimates gas and electric dealer appliance advertising at less than one-tenth the volume of utility appliance advertising in his territory.

In many areas this condition obtains in spite of the fact that the utilities are doing a minor share of the appliance business. To illustrate with an electric example, the California Retail Council has estimated that utilities do 90 per cent of the appliance advertising, while dealers sell 85 per cent of the appliances. That this is a common situation is further seen in Pennsylvania, where utilities are credited with selling only 10 to 30 per cent of the appliance volume, depending upon whether their territory is rural or urban.

Replies from many individual gas companies also state that their appliance advertising greatly exceeds that of their respective dealers. Information submitted by individual publishers from a number of states attests the same fact. There is no doubt but what the utility supplies the background for appliance sales.

This lack of dealer advertising, though it demonstrates the utilities' dominant place in market-building, also clearly points to one important goal for company-dealer programs. Keep the volume of utility advertising undiminished; at the same time build dealer advertising into a real force; greater sales accomplishments cannot fail to result.

Unsold Markets Revealed in Survey Work

Leaving the utility-dealer developments of 1931-1932 for the moment, another field in which noticeable progress was made is that of market analysis. During 1931-1932 the gas appliance sales department has grown "survey-conscious." Perhaps this may be attributed partly to the tightened competition, the need for directing sales effort into profitable channels and eliminating waste motion. At any rate, the search for more exact market information is proceeding at a gratifying rate.

Survey work in every instance which has come to the writer's attention has developed some astonishing conditions—usually pointing definitely to unsaturated markets for gas appliances. Our field is under-sold; in some cases we need new appliances for purchasing levels or for uses now unserved; competing fuels at some points have made surprising inroads into established gas territory and basic uses; dealer outlets are definitely needed in greater number and potency. These are some of the conclusions which follow on the heels of market survey programs.

A number of utilities have recently furnished information to *Western Gas* on unsaturated markets. The reports below come from many points throughout the country, and indicate a condition which could be duplicated on most systems. Such facts are a challenge to better salesmanship, improved market knowledge, fuller realization of the sales potential.

A natural gas property of 14,000 active meters on the basis of recently completed survey work expects during the next six years through dealer and company sales to add the following to its system: 5,000 ranges, 7,500 water heaters, 3,500 furnaces and 3,000 furnace conversions, 1,000 boilers, 1,500 circulating heaters, 3,500 floor and wall furnaces, 2,000 space heaters, 1,000 refrigerators, and other appliances in proportion. Normal meter increase is figured into this estimate, but since the property is a long established one the figures in the main represent present unsold markets.

Another natural gas utility which has observed an aggressive sales policy for many years, recently conducted a survey in two of its communities and found a 4 per cent saturation of electric ranges. More attention to gas range sales is being given in this area.

A prominent eastern company serving natural gas to nearly 150,000 consumers, ran a survey on central house heating plants covering 55,000 of its meters. It was found that only 10 per cent of the houses were gas-heated. Unsaturated markets for other appliances were found by the same company in other survey work.

A California utility on the basis of salesmen's canvasses has discovered a tremendous market for automatic water heaters, not known to exist before this sales activity was undertaken.

A new natural gas property in the Middle West estimates its available market as follows: 95 per cent available on heating, 5 per cent on cooking, 75 per cent on water heating. This condition is the same existing in hundreds of towns where natural gas is a recent entrant. Those interested in the extent of this field may turn to *Western Gas'* survey of new gas communities, appearing in this issue.

Another western natural gas property ran a survey on a group of 20 towns. An 82 per cent saturation was found for gas waterheating, with 16.3 per cent of the homes having no water heaters. While 71.3 per cent of the homes used gas for space heating, this saturation ranged as low as 26.2 per cent for one community. For cooking, 90 per cent of the homes used gas, 3 per cent electricity, nearly 5 per cent wood. Nearly 1 per cent of the homes had gas refrigerators, 10 per cent electric, 70 per cent ice, and 20 per cent none.

Of the 475,000 domestic consumers on one large natural gas system, 264,000 either have no heating facilities or depend upon coal or wood in fireplaces or heaters, according to this company's recent survey.

Many companies report plans for constructive survey work under way. The trend in this direction is very marked, the aim being in most cases to secure not only the facts on appliances now in use but to estimate purchasing power, record the type of residence and gain other facts of service in directing the sales program. A better job of selling is ahead for gas utilities.

Incomplete Sales Data a Handicap

One branch of market information which is essential in guiding the utility's load building is that of dealer sales. Having a working knowledge of market opportunities, it is of equal importance to know the full strength of the sales force—of which the dealer is a part. With a few notable exceptions, utilities have made little progress toward getting this dealer sales information. Development of cooperative programs will open more avenues for these data, informing companies on the class of merchandise which is going onto their lines, enabling them to check installations and render service where necessary, giving exact knowledge of the dealer's importance as a sales ally, showing directions in which his efforts may be made more productive.

A few companies have recognized the need for dealer sales figures, and it is of interest to consider some of their methods for securing them. The following sources were reported to *Western Gas* by a number of companies, in answer to recent inquiry:

1. Direct call upon dealers by company representatives. Some companies contact dealers almost daily for sales figures. "Dealer representative" is a title which is becoming more familiar on utility sales staffs.

Many companies attempt to get dealer information on some single appliance, such as heating equipment, but do not secure data on other lines. A number of companies make direct and regular contact with all dealers in heating equipment for their sales, for the purpose of compiling consumption figures, and inspecting installations.

Most companies with active dealer cooperative programs have devised dealer report systems, and employ dealer contact men to assist in periodic compilation of these data. Wholesale reports are secured in some instances, for comparison with summarized company-dealer totals, to secure completeness.

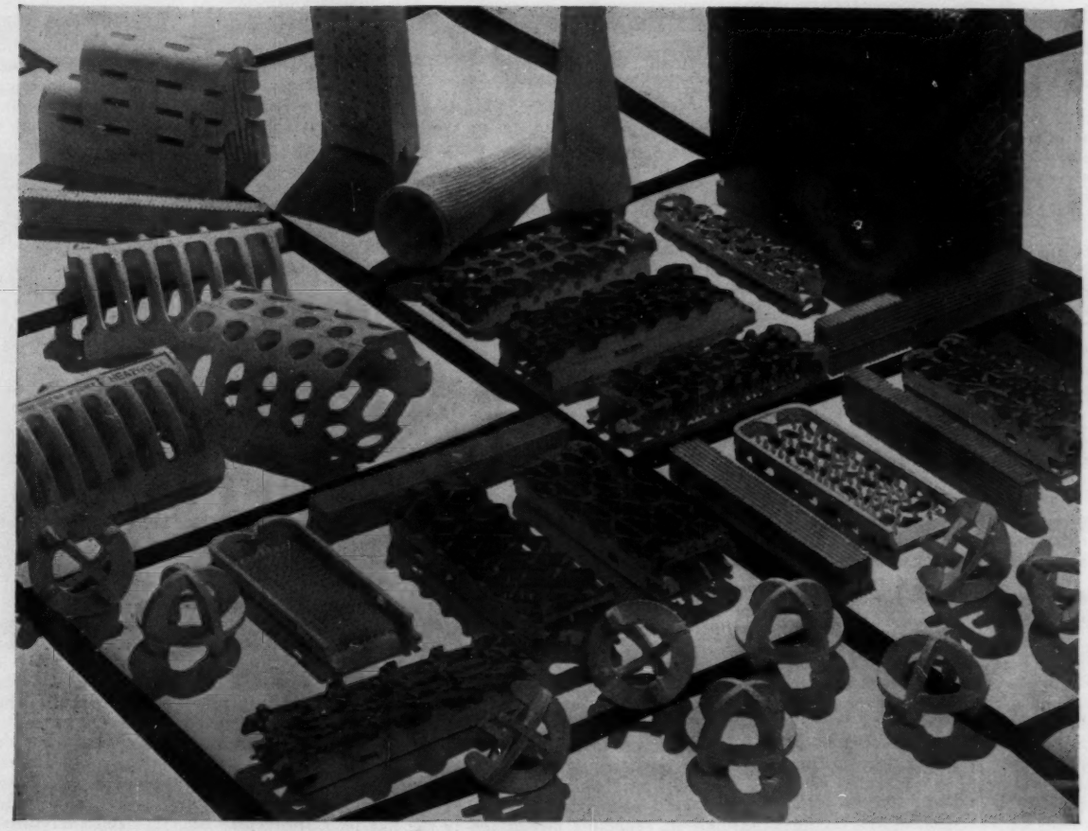
2. Where ordinances require that the gas company make the turn-on, dealers report sales to company in advance of or at time of installation. This is checked by service man, who lists the appliances added.

Ideally, a 100 per cent coverage of dealer sales may be secured by combination of the above two methods—securing information from dealers, and checking it through the utilization department.

3. One company is enabled to check gas heating equipment sales on its system because a separate metering installation is required for heating appliances.

4. Financing arrangements entered into between dealers and utilities on some major appliances of course provide a full picture of distribution on these units.

5. In an increasing number of cases wide-



"GENCERACO REFRACTORIES"

DEVELOPED FOR Gas Appliances, Specified By Leading Manufacturers,

Serving in *thousands of nationally marketed appliances!*

Years ago when manufacturers learned the value of good refractories in gas appliance performance they turned to this company for their materials. Since that time each year has seen more and more appliance manufacturers specifying GENCERACO REFRACTORIES to assure the best performance of their products. It is significant that many of the best known appliances are equipped with these refractories.

But the reputation of these refractories is not a matter of chance, it is the reflection of satisfactory service in thousands of nationally marketed appliances. It is a demonstration of the fact that our ceramic engineers, with their years of experience in fine refractory making, are capable of developing and making excellent materials for you.

Why not ask for an estimate on the pieces needed for your appliance? Your inquiry will bring prompt response.

GENERAL CERAMICS COMPANY

71 West 35th Street, New York, N. Y.

Plants at Keasby and Metuchen, N. J.

awake local trade associations are seeing the advantage of having a complete analysis of sales in their trade area, and to that end are compiling this information.

6. In many communities ordinances require that permits be taken out for installation of various appliances. This applies especially to water heaters. Where such ordinances exist they provide an exact and complete record of sales activity.

7. Some companies using the closed territory system for outside salesmen hold their sales representatives responsible for reporting all merchandise sold in their territory by dealers. This, ideally, results in a constantly revised consumer survey, but in large sales areas it is of course difficult to cover the territory rapidly enough to give dealer information maximum value for checking installation work.

Building a system which will yield complete and current dealer sales information is undeniably a difficult task—but its importance justifies the effort. More and more of this information will be available as a result of the cooperative programs now in operation or forming, and as a result utilities will have a background for doing a progressively better job through their allied dealer outlets.

The months ahead will make unusual demands of the gas company sales department. Elsewhere in this issue are reviewed the national advertising programs which both gas and electric industries are now framing. Supported by strong local effort, these programs will step up the sales pace. Alert managements in this period will not forget the lessons of 1931-1932. Market opportunities will be exactly analysed; strengthened dealer contacts will enable the utility to guide its sales program more surely, and should build domestic load more effectively than ever before. Promotion of new uses, among them air conditioning with its large possibilities, will not be neglected. The stormy period now ending has advanced the general cause of utility merchandising, leaving the industry free to constructively develop its services.

Pipe Line Soil Surveys

(Continued from Page 51)

the stream edges, tell their own story. Vegetation indicates the type of soil, its moisture, and its boundaries. Lack of vegetation may mean acid or alkali bogs, leached sandy soil, or extreme dryness. The type of vegetation gives many clues also. Dry stream beds should be examined to see if they will become washes in rainy weather. The general topography of the country show which sections will probably be moist and which dry. The writer would like to make the point here, however, that general topography will not necessarily indicate the chemical analysis of the soil, especially in arid regions. In other words, one is never safe in assuming that hillsides will be leached out and non-corrosive. Vigilance in soil sampling and testing should be increased where topography renders one suspicious, but should not be relaxed where conditions look favorable. Other general observations should include examination of existing pipe lines along the same route, and conversations with patrol-men and pump station operators regarding life of these lines; also with local inhabitants regarding rainfall, etc. Lastly, the actual route should be carefully contemplated to visualize the working difficulties of coating application and to decide whether pre-treated pipe can be successfully transported and installed or if protection must be done in place and what types can be used effectively.

Other Investigations

Inquiry should be made to see if other pipe lines traverse the same route and if so what the corrosion experiences have been. If the new line comes very close to or crosses any others special protection precautions must be taken to prevent exchange of electric currents from one to the other, usually from the old to the new. Probable development of the areas traversed should be considered—such developments as might create artificial or man-made corrosive conditions, such as chemical works discharge. Street railway proximity should be checked and provisions made to bond to the rails to avoid electrolysis or to bond to other sub-structures that have themselves been drained to earth potential. Season and annual rainfall is useful information; also seasonal temperature of both atmosphere and earth.

Having now visualized the soil survey program, we can outline briefly a few points of organization. The general route should be

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Gas and Electricity

(Continued from Page 47)

as for natural gas, nevertheless it seems to be quite encouraging. Except for a very few isolated cases manufactured gas now sells at a considerably lower average cost per B.t.u. than electrical energy. As time goes on it seems reasonable to assume that this difference in commodity cost will be maintained, if not actually increased. The use of refinery gases for enrichment purposes, mixing of gases, and many other recent developments in the process of producing manufactured gas should act to maintain lower operating costs for gas-burning equipment.

Another new and promising development that should assist the gas industry in maintaining its economic advantage is the use of liquefied petroleum gases in rural districts. These fuels afford an opportunity to secure a class of business that under other circumstances might be forever lost to city gas.

A study of Table No. 1 will show that the use of petroleum, gas, and electricity has increased materially during the past 10 years, while coal, coke and wood, if not barely holding their own, are actually losing ground. These data indicate the manner in which the nation's total energy requirements are being met and while it appears that the use of electricity is increasing faster than gas, it can be seen that it still does not supply nearly as large a percentage of the nation's energy requirements as gas. Furthermore if these statistics are analyzed far enough it will be seen that the increase in the use of electricity is not due to the replacement of gas as a fuel but to the increased residential lighting load, the electrification of farm and factory machinery, railroads, and many of the other more or less non-competitive uses of electric power.

Practically everyone in the American gas industry will concede the residential lighting load to electricity. Where heating operations are involved, however, this is another matter. Just as electricity by virtue of its characteristics seems best adapted to residential lighting purposes, gas on account of its lower first cost, ease of application and constancy of supply, seems best fitted to provide the fuel requirements of the modern home. Such uses, of course, would logically include cooking, water heating, house heating, and in many instances refrigeration.

The relative cost per B.t.u. of energy supplied to the customer can be readily computed. Taking into account carrying charges, efficiency in utilization, and commodity cost, the cost of service therefore can easily be derived. It is felt that the factors of cleanliness and convenience are about equal for modern types of gas and electric domestic appliances, notwithstanding many sales arguments to the contrary. The success which has accompanied the sales efforts of most concerns merchandising electric appliances is attributed more to the results of effective advertising and the aggressiveness with which such sales campaigns are carried out rather than to any fundamental advantage that electrical equipment might possess.

Cooking: Table No. 2 gives some comparative statistics on the cost of gas and electricity for domestic cooking purposes.

Based on average rates, taking into account carrying and maintenance charges, it can be seen that the cost of electricity for cooking is approximately twice that resulting from the use of manufactured gas. As natural gas has, roughly, twice the average heating value and its average cost is about 38 per cent less than that of manufactured gas, its ultimate cost for domestic cooking purposes should average less than one-third that of electricity.

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TABLE NO. 2. COMPARATIVE COSTS OF GAS VS. ELECTRICITY FOR DOMESTIC COOKING PURPOSES

Item	Electricity	Gas	Excess of Electricity over Gas, per cent
1. Est. initial cost of range	$150.00	$100.00	50
2. Est. annual carrying charge (Assum. 10 yr. life)	15.00	10.00	50
3. Est. annual cost of maintenance	2.50	1.50	66
4. Ave. cost of service per unit of measurement	*0.0352	*1.14	....
5. Est. monthly consumption Kwh. or Cu. ft.	35	1200	....
6. Est. monthly cost of energy	2.99	1.37	118
7. Est. monthly carrying charge	1.25	0.83	50
8. Est. monthly maintenance costs	0.21	0.12	66
Total Monthly Cost of Service (Items 6, 7 and 8)	$ 4.45	$ 2.32	92

* Average costs of manufactured gas and electric service supplied, respectively, by the American Gas Association and the National Electric Light Association.

Payne

HEAT

Better Class Heating & Ventilating Co.

◀ *Job Sign Used By Payne Furnace Contractors and Installers* ▶

◀ This Sign Signifies . . .

a First Class Home Heating Installation

. . . You see it on the Better Class of Buildings Everywhere

Modern Heat for Modern Homes . . .

Gas Heat is simple, easy to install, clean, healthful, economical and readily controlled. *Payne Heat* Systems adapt it to every domestic and commercial problem.

AMONG the Payne line of furnaces there is one "best" type for each different building; there is one "best" furnace for each different home condition and for each climate. No other furnace will do as well. This has not been brought about by chance, but by the reduction of experimental findings to an exact heating science. From trial and experience Payne engineers have made possible the statement that "There is a *Payne Heat* System for every climate and building." This fact gains added meaning in the national use and national reputation of

PAYNE HEAT

East and West, Payne Furnaces are now satisfactorily heating all types of residences, from elaborate mansions to the most modest dwellings. And wherever they are used they have come to be recognized as an assurance alike to the owner, architect, builder and contractor of the correct type of equipment for the problem at hand, correctly engineered, correctly installed, and guaranteed.

OPPORTUNITY

WITH the 1932 building season just getting under way, this is a good time to get in touch with us regarding a dealership for your city. It is a profitable connection to make and becomes more valuable year by year. The users of the installations you make this year are your enthusiastic boosters next year. By securing the Payne agency today, a big successful business is assured in 1935.

Don't allow "Opportunity" to knock at your door in vain.

Write today, before it is too late.

Payne Engineering Service

Architects, Building Contractors and Heating Engineers are invited to put their troublesome warm air heating problems up to Payne Engineers. Send floor plans and full details of heating requirements. No matter how large or how small your installation may be, the Payne Furnace & Supply Co., Inc., is ready to cooperate with you.

AMERICAN GAS ASSOCIATION · APPROVED · COMPLIES WITH NATIONAL SAFETY REQUIREMENTS

Payne Furnaces are submitted to the A. G. A. Testing Laboratory—approval signified by above seal.

PAYNE FURNACE & SUPPLY COMPANY, Inc.

BEVERLY HILLS, CALIFORNIA

"There is a PAYNE HEAT *System for Every Climate and Building"*

TABLE NO. 3. SHRINKAGE TESTS

Item	Electric Ranges A	Electric Ranges B	Gas Ranges A Insulated	Gas Ranges B Insulated	Gas Ranges C Non-Insulated
Shrinkage—average per cent for each range	18.94	22.25	19.80	21.50	21.35
Shrinkage—average per cent for each type		20.59		A, B, and C average	20.88

The above figures do not take into account installation charges which vary widely for electric ranges and are usually from two to three times higher than for gas ranges. This fact, of course, makes the comparison still more favorable to the use of gas.

A very rough estimate of the number of gas ranges now in service is 15,000,000 (4) while the most recent material available on electric ranges seems to indicate that about 1,000,000 (5) such appliances are in use.

Water Heating: It is considerably more difficult to compare the cost of heating water than it is for domestic cooking for the reason that the hot water requirements of the American people vary much more widely than they do for cooking. Furthermore, there are at least three general and distinct kinds of water heating systems, such as the manually controlled, instantaneous and automatic storage types. The class of service employed naturally affects the size of the customer's monthly bill. Further than this, we have the differences in the initial costs of equipment and corresponding variations in resultant installation, carrying, and maintenance charges.

A rather elaborate investigation of domestic water heaters using modern gas and electric appliances was made by the A.G.A. Laboratory in 1931. This study indicated that the initial cost of comparable types of electric water heaters was, roughly, 50 per cent greater than for gas. Installation charges for electric water heaters vary widely and average about twice as high as for similar kinds of gas water heaters. Manufactured gas operating costs of the latter average about 50 per cent that of electric heaters. Still further, the use of double throw and automatic time-clock switches and off peak heaters limits considerably the available amount of hot water that can be obtained from electric heaters and by virtue of this fact occasionally interferes with the supply in such a manner as to cause annoyance to the customer. (6)

Taking into account differences in maintenance costs, carrying charges, operating costs, etc., it seems quite fair to assume that the total cost of supplying hot water service through the medium of electricity would average, roughly, twice as great as gas in manufactured gas territories and, roughly, four times as much where natural gas is available. At the present time there are, roughly, 7,000,000 (7) gas water heaters in use compared with about 160,000 (8) different types of electric water heaters.

It is realized, of course, that a few electric utilities supply current during off peak hours at a flat rate charge which is equal to, if not actually less, than that charged per B.t.u. for energy sold in the form of gas. Where comparable service is supplied this often means that electricity is sold below 1 cent per Kwh. Justification for such a rate, when some customers in the same territory are charged as high as 8 or even 9 cents per Kwh. for current for residential lighting purposes, is a matter that is open to question.

Central Heating: It really seems unnecessary to consider electricity seriously for central heating purposes, as the possibilities of such a development yearly become more remote. In the first place, if it were necessary to produce such tremendous amounts of electricity it is very doubtful if it could be done as economically as at present. Still further, the cost of such service even at prevailing rates would be entirely out of line with competitive fuels, and aside from this it is believed that the modern type of central heating gas appliance actually provides a more acceptable form of house heating service.

Refrigeration: Gas refrigeration is a comparatively new development, yet in some territories, particularly New York City, equipment of this nature is competing very successfully with electrical units. The fact that this situation does exist in a manufactured gas territory where water rates are at least average, seems to indicate that gas refrigeration should be ideally stituated from a competitive standpoint in natural gas territories.

Assuming a water rate of $1 per thousand cubic feet and a consumption of 1.7 gallons per hour for a 5-foot box, and an average natural gas rate of 70 cents per thousand cubic feet, the total operating costs of a gas refrigerator per month should amount to about 82 cents. This figure would compare with roughly $2.32 for the same class of electrical refrigeration service. Carrying charges and maintenance costs are not included in this comparison as they would probably be so nearly equal when taken over the entire United States that they may logically be neglected. At the end of 1930 it is estimated that there were approximately 200,000 (9) domestic gas refrigerators in use compared with about 1,800,000 (10) electrical units.

It is readily understood that there are many factors to be taken into consideration when purchasing a range, water heater, refrigerator or space heater, other than those of first costs and operating costs. It is impractical to enumerate all such items, much less discuss them. There are a few outstanding points, however, that it is felt warrant brief comment herein. One of first importance is speed in performance. Tests conducted by the A.G.A. Laboratory in 1931 on comparable types of gas and electric ranges indicate that the former require, roughly, two-thirds the time to accomplish the same amount of work as an electrical unit of similar capacity. When water heaters are taken into account the comparison is even more favorable to gas. Tests on three gas and two electric water heaters comparable as to type and of the same storage capacity demonstrated that the gas heaters require from one-half to one-tenth the time to accomplish the same amount of work.

So much has been said on the subject of meat shrinkage in discussing different kinds of cooling service that it is thought well to comment on this subject briefly. Table No. 3 gives comparative data on shrinkage tests. While this work was conducted at the American Gas Association's Laboratory (1931), the tests in each instance were made under exactly similar circumstances and by home economic experts who had no active interest in either industry.

Although it is known that different types and designs of ovens would give slightly different results, it seems unreasonable to assume that the nature of the orignial source of heat supply would have any direct bearing on the final results.

From time to time the item of cleanliness has been brought up in discussing the relative merits of gas and electric appliances. It seems this consideration is used more often as a sales argument against gas equipment than electricity, notwithstanding the fact that there is considerable that can be said on both sides. Generally speaking, criticisms of this nature are aimed at the gas range. Often it is maintained that the dark greasy deposits found in some kitchen walls originate from the gas. Actually they are the product of grease which arises from the cooking and mixes with dirt present in the kitchen atmosphere. It is admitted that some moisture is formed during the normal process of combustion from the open top gas range burner, although at the same time it should be pointed out in fairness to gas that this feaure in many instances is a desirable characteristic. It is believed that in most of the homes heated by central heating plants today regardless of the nature of the fuel involved, the relative humidity in the heated portions of the building is too low. Consequently, some added moisture should not come amiss.

Gas and electric rates vary so widely that it might be contended that it is inaccurate to generalize on the cost of such classes of service. To assist those interested in actually comparing costs under local conditions, Charts No.'s I, II, III and IV have been prepared. Chart No. I shows equivalent electric rates in cents per Kwh. as compared to various city gases, ranging in heating values from 300 to 1150 B.t.u., with rates varying up to $2.50 per thousand cu. ft. Efficiencies in utilization have been taken into account but not maintenance or carrying charges. This same general scheme has been followed in the preparation of Charts No.'s II, III and IV, although the range in heating value of the gases used in some cases is slightly different.

Gas clearly possesses an economic advantage over electricity, not alone from the standpoint of initial cost of the appliances which utilize it but from the viewpoint of operating costs. The generation of hydro-electric power, perhaps one of its keenest competitors, is not increasing as rapidly as electrical energy produced from steam plants. While it seems entirely probable that the use of electricity will materially increase, particularly for residential lighting purposes, during the next few years, it does not appear as time goes on that the economic relationship will become less favorable to gas. As a matter of fact, the discovery of new natural gas fields, the practice of mixing gases, increases in the size, capacity and tensile strength of long-distance gas mains, combined with general improvements in the industry's send-out characteristics resulting from the greater use of its product for house cooling and industrial purposes, should increasingly favor gas.

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We're Selling Your Prospects *the* Economy *of* Gas Cookery

"A good way to meet 1932 conditions, Mr. Manager"

HOW can I reduce cooking costs? That's a question which is bothering managers of hotels, restaurants, clubs, hospitals and schools in your city. And you have the answer . . . gas cooking with the New Vulcan equipment. And we're telling them that you have the answer with this forceful factful advertisement, and others that will follow.

Take advantage of the increasing interest in the economies of gas cookery. Start your men out canvassing every place with equipment more than five years old. . . . Show them how new equipment will pay for itself in economies over present time, food, labor and money wasting equipment. Ask for full size proofs of this advertisement for your salesmen to carry and show prospects.

SAVE WITH THE NEW 1932
VULCAN JUNIOR
GAS COOKING EQUIPMENT!

Here's a solution for that 1932 problem "How can I cut cooking costs?" . . . a new line of Vulcan Junior gas ranges especially designed to reduce fuel, labor and food costs.

Here are facts on how these savings are accomplished:

1. Reduce heat losses and gas consumption in oven cooking. *Thick insulation* keeps heat in the oven.

2. Make more effective use of oven heat, due to *improved flue system.* Ovens roast and bake equally well.

3. Prevent overheated ovens and resultant food shrinkage and waste of gas by means of *Oven Heat Control,* which passes just enough gas to maintain temperature desired . . . and no more.

4. Make top cooking more efficient by spreading heat from one burner under entire *"All-Hot-Top."* Every square inch is usable. Aerated burner has three separately controlled rings. All three rings heat top quickly, then one keeps it hot, economically.

5. *Reduces labor costs.* You get more work from your kitchen force . . . due to more comfortable working conditions. . . . heat is used to cook food and not to heat the kitchen . . . ranges require less watching because of closed top and oven heat control . . . smooth front of range is kept clean more easily, with less work.

We know of instances where Vulcan Heavy-Duty gas ranges have cut fuel bills as much as $400 per month. Proportional savings should be made by this new Junior Line, for though smaller in size, it embodies the efficiency and low operating and maintenance costs of the Vulcan Heavy-Duty line. Operators of small restaurants, hotels, tea rooms, hospitals, clubs, schools and churches are invited to write for full details on these money-saving gas ranges.

STANDARD GAS EQUIPMENT CORP.
18 East 41st Street, New York City

VULCAN

VULCAN EQUIPMENT MAKES THE MODERN EFFICIENCY FUEL . . CLEAN, FAST AND ECONOMICAL

● *This is the new Vulcan 4712 Junior Range with Salamander Broiler at top and a new All-Hot-Top and open top combination cooking top.*

● *The new Vulvan 4700 Junior All-Hot-Top Range with high shelf.*

New York . Philadelphia . Baltimore
Chicago . Boston . Birmingham
Pacific Coast Distributor: Northwest Gas & Electric Equipment Co., Portland, Oregon.

This advertisement is reaching over 80,000 prospects through Hotel Management, Hotel Monthly, Restaurant Management, American Restaurant, Modern Hospital, Hospital Management, Hospital Progress, Nation's Schools, American School Board Journal and Pacific Coast Record.

COMPARISON OF MUNICIPAL WITH COMPANY GAS RATES OKLAHOMA UTILITIES ASSOCIATION

(Basis of 5000 cubic feet used)

(Comparisons are between towns of nearest the same population)

Town		Population	Net Rate (Oct. 1, 1931)
Castle, Okla.	(Municipal)	283	60c per M.c.f.
Agra	(Company)	253	58½c per M.c.f.
Cleveland	(Municipal)	2959	60c (winter months)
			85c (summer months)
Chandler	(Company)	2717	45c
Covington	(Municipal)	927	50c per M.c.f.
Cyril	(Company)	922	57c per M.c.f.
Fairfax	(Municipal)	2134	57c per M.c.f.
Erick	(Company)	2231	45c per M.c.f.
Granite	(Municipal)	1341	60c per M.c.f.
Rush Springs	(Company)	1340	57c per M.c.f.
Kaw City	(Municipal)	1001	50c per M.c.f.
Ringling	(Company)	1002	45c per M.c.f.
Mangum	(Municipal)	4806	50c per M.c.f.
Drumright	(Company)	4972	50c per M.c.f.
*Pawhuska	(Municipal)	5931	35c per M.c.f.
Pawhuska	(Company)	5931	38c per M.c.f.
Pryor	(Municipal)	1828	60c per M.c.f.
Quinton	(Company)	1804	25c per M.c.f.
Willow	(Municipal)	347	60c per M.c.f.
Crowder	(Company)	340	43c per M.c.f.
Yeager	(Municipal)	300	45c per M.c.f.
Canadian	(Company)	295	40c per M.c.f.

Average municipal rate for first 5000 cubic feet.....52.7c
Average company rate for first 5000 cubic feet.....45.8c

*City plant serves about 180 out of 1600 customers.

In computing the above averages, rates applying at Cleveland and Chandler were not included because of the irregular rate effective at Cleveland. Including these two towns the averages are:

Winter		Summer	
Municipal	53.4	Municipal	55.6
Company	45.7	Company	45.7

Natural Gas in the "Sooner" State

(Continued from Page 33)

towns in other southwestern and central states.

Extension of gas lines in Oklahoma reached its peak in 1928 when 54 towns granted gas franchises and 32 received natural gas service. Last year, in spite of unfavorable economic conditions, Oklahoma gas companies continued their program of extensions and betterments. Approximately 300 miles of new transmission lines were laid, and gas franchises were granted by 25 towns. New gas distribution systems were completed or started at Boise City, Buffalo, Coyle, Guthrie, Haskell, Langston, Laverne, Mulhall, Porum, Red Oak, Shawnee, Supply, Spiro and Verden. Most of the other towns which voted franchises during 1931 are believed to have prospects for gas distribution in 1932.

Among companies which constructed new lines or extended their systems last year are the Oklahoma Natural Gas Corp., Cities Service Gas Co., State Fuel Supply Co., Panhandle Power & Light Co., Braman Oil Co., Oklahoma Utilities Co., Western Service Corp., Public Service Co. of Oklahoma, Union Public Service Co. and Cherokee Public Service Co. All of these extensions were of less than 100 miles, and were made for the purpose of reaching towns which had granted franchises, or for tapping new sources of supply.

Conditions at present are unfavorable in Oklahoma, as in other sections of the gas producing area, for major extensions during this year. A survey, which includes only companies having service lines in Oklahoma, indicates an estimated expenditure of $250,000 for extensions and betterments in 1932. This survey, of course, does not take into account any new projects which may be launched during the year. Most gas companies in Oklahoma, in order to meet present economic conditions, have made material reductions in their rates. In addition, they have experienced the mildest winter in many years, and have suffered heavy loss in domestic and industrial sales. These conditions have a deterring effect upon plans for extensions and the present year may show a decline in expenditures for improvements. All of the companies, notwithstanding these difficulties, have maintained their high standard of service.

There is a feeling among gas men in Oklahoma that the public is gradually becoming educated to the fact that there is an important difference between the natural gas business and other branches of the utility industry in that the natural gas company must spend large sums, and in fact does spend amounts running into seven figures each year, to guarantee adequacy of service for the future. In many cases it is realized that these expenditures are made without either expanding markets or developing new sources of revenue, as would be the case with other utility operations. There are instances on record in Oklahoma where pipe line projects, costing a million or more, have been put through to reach apparently promising sources of supply with the result that the same proved worthless, either before or simultaneously with the completion of the pipe line. An exhibit, filed with the Oklahoma Corporation Commission in one gas investigation, showed 52 gas pools to have been connected to the system concerned during the preceding five years, of which 28 pools were shown to have been entirely exhausted when the exhibit was presented, and of the remaining 24 only five to have been productive for as long as two years.

The Municipal Issue

Municipal ownership agitation, extensive in the electrical field in Oklahoma in recent years, has given less concern in the gas industry, but exists as a threat or club in the hands of local agitators in most cities located within reasonable transporting distance to gas producing areas, which now include most of the important cities of the state. Comparison of rates effective in towns having municipal gas with those of company served towns of similar population offers little encouragement to the municipal ownership advocate. Ten small cities and towns in Oklahoma (Castle, Cleveland, Covington, Fairfax, Granite, Kaw, Mangum, Pryor, Willow and Yeager) now are operating municipal gas systems. In addition to these, Pawhuska, served by a gas company, has a municipal gas system with about one-eighth of the meters in the town. Attached hereto is a statement showing the average net gas rate on a basis of the first 5,000 cubic feet used in these towns. This statement also shows the average gas rates on the same basis of towns of nearest to the same population served by utility companies. This statement shows the average municipal rate substantially higher than the utility company average rate.

Oklahoma leaders of the industry anticipate a bright future, in Oklahoma as well as in other sections of the United States, for the gas business, through further applications in use and annexation of additional markets for their fuel. While all but six of the 77 counties in Oklahoma have been reached by gas lines, there are yet many towns and industries in the state not yet served. The state is young in years and in industrial development, and without doubt great possibilities lie ahead for the progressive gas utilities.

To Increase Sales
NORTHERN CALIFORNIA DEALERS
Use Tie-in Advertising

NORTHERN California gas appliance dealers have turned a deaf ear to the talk of adverse conditions and place themselves head and shoulders above the crowd by tying in with Pacific Gas and Electric Company advertising.

That intelligent and consistent use of this merchandizing plan brings in a greater number of prospects and produces more sales, has been proved beyond any doubt, during the past two years.

An example of tie-in advertising and the nature of its use is presented in the newspaper page reproduced here. The Pacific Gas and Electric Company advertisement, designed to "sell" all the advantages of using approved gas appliances, occupies a dominant position by reason of its size. An invitation to visit dealers' stores closes the copy. As an immediate answer to the logical questions of prospects, dealers' tie-in advertisements answer WHERE, WHO, and WHAT.

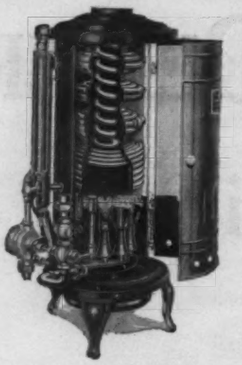
To enable aggressive dealers to key their tie-in advertising accurately, a broadside is mailed to all dealers each month. Reproductions of forthcoming Pacific Gas and Electric Company advertisements, together with current campaign plans ,are presented in this mailing piece.

Thus the desire-building advertisements of this utility are followed up by the closing-sale copy of local dealers.

PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
Owned·Operated·Managed
by Californians

WG-205-532

HOFFMAN



Our unbeatable combination of High Quality and Low Price means extra dollars for you. Write us today.

THE HOFFMAN HEATER COMPANY

1701 Dixie Highway
Louisville, Kentucky

AT RIGHT

Factory of the Pittsburgh Equitable Meter Co. and Merco Nordstrom Valve Co., Oakland, Calif., factory headquarters for the West Coast.

Pittsburgh Equitable and Merco Join Interests

ARRANGEMENTS have been completed for the Pittsburgh Equitable Meter Co. to acquire all the capital stock of the Merco Nordstrom Valve Co.

A study showed the sales efforts and objectives of the two companies to be along parallel lines and, accordingly, decided advantages could be gained through an association of interests, since Nordstrom Lubricated Plug Valves, manufactured by the Merco Nordstrom Co., are sold in the gas, oil, and chemical trades to the same customers that are buying "Emco" meters, regulators and instruments from the Pittsburgh Equitable Meter Co.

This association gives each company additional manufacturing facilities—the meter company securing a Pacific Coast plant to take care of a rapidly expanding business, while the valve company acquires manufacturing facilities for serving Eastern and Mid-Western customers.

W. F. Rockwell, president of the Pittsburgh Equitable Meter Co., becomes president of the Merco Nordstrom Valve Co., and several directors of the Merco Nordstrom Co. have been added to the board of the meter company. The principal executive offices of both companies will be located in Pittsburgh.

Each company is making its district offices and warehouses available to the other. Warehouse stocks for both companies will be carried at Los Angeles, Calif.; Kansas City, Mo.; Chicago, Ill., and Columbia, S. C., as well as several other points.

Factory warehouse stocks, to cover the territory adjacent to New York, will be carried at Hopewell, N. J. Middlewest factory stocks will be carried at Pittsburgh, Pa., and Tulsa, Okla. The factory stock for the West Coast will be carried at the Oakland, Calif., plant.

Sales offices will be maintained at all of the above points and also at Houston, Texas; Dallas, Texas; Denver, Colo.; Salt Lake City, Utah; Columbus, Ohio; Philadelphia, Pa., and Boston, Mass. Additional sales offices and warehouses will be opened at strategic points as the expansion of business requires.

A large amount of new machinery is being installed in the Pittsburgh plant. Several new products are being brought out which will be added to the line or which are accessories for the present line.

The Pittsburgh Division of the Pittsburgh Equitable Meter Co. was founded by the late George Westinghouse. The company has been a pioneer in the development of both gas meters and regulators for the natural gas industry. The Merco Nordstrom Valve Co. was founded by S. J. Nordstrom, who invented the sealed port type of lubricated plug valve and is responsible for the many improvements which have been made in the last 15 years.

NO-OX-ID
IRON-OX-RUST
The Original Rust Preventive

FILLERS RED GRAY–BLACK

Much reconditioning work in maintenance of gas holders and tanks will be necessary this year.

Adapted especially to this work as a cushion bond for paint, we announce rust inhibitive NO-OX-ID FILLER RED. This material sets to a dry state in a few hours, but does not become hard and brittle. Aluminum paint is highly recommended as an application over NO-OX-ID FILLER, although paint to match any color scheme can be used.

Also, there are many places protected from the weather where these FILLERS in red, gray or black give excellent service without paint. Inquiries invited.

DEARBORN CHEMICAL CO.
LOS ANGELES:
807 Mateo Street, Phone TRinity 3385
SAN FRANCISCO
421 Bryant St., Phone DAvenport 658

"Antileke"

The hypo-sealed pipe joint saves 20% to 50% in laying cast iron or steel pipe and repairing any ordinary or difficult gas leaks.

Thousands in use without a single failure.

GAS & ELECTRIC FACILITIES, LTD.
447 Sutter St., San Francisco

Send literature and prices on "Antileke"

Name.....

Address.....

City.....State.....

Pacific Pipe & Supply Co. Standardizes Its Odorization Equipment

COMPLETE reconstruction and simplification of Papico odorizers to effect standardization of the units are announced by the engineering department of Pacific Pipe & Supply Co., Los Angeles. The basic principles originally incorporated in the odorizers are embodied in the three new styles, known as types AH, BH, V15 and VS. The AH has a capacity of 300,000 cubic feet per day, BH—1,500,000 cubic feet, and V15—over 1,500,000 cubic feet. The two smaller units are of the horizontal type, while the V15 is of a vertical unit construction. Each of the units has capacity for one week's supply of odorant when operated at maximum. All three types are for working pressures to a maximum of 150 pounds with safety factor of five, but type VS can be constructed for any pressure if desired.

Automatic proportionality of the odorant

is provided by an improved calibration chamber and liquid orifice housing. If the gas flow stops, injection of the liquid odorant stops automatically. When the gas flow resumes, the liquid injection is automatically picked up. The design of the mechanism prevents syphoning or over-feeding of odorant. A special pressure float maintains a constant liquid level for the feed through the orifice. The liquid is shut off when the gas stops, so that no hydrostatic head is on the orifice. All specifications meet A.S.M.E. code.

Types AH and BH can be erected directly upon the gas line; type V15 is mounted on a cement foundation. Further details may be procured from the manufacturers, located at 1004 Santa Fe Avenue, Los Angeles, Calif.

Pipe Line Soil Surveys

(Continued from Page 84)

studied and the best possible maps obtained, on which are marked the projected and alternative routes, and all significant landmarks. At least one member of the party should be familiar with the various localities traversed, as regards highways and by-ways, as otherwise much time will be spent trying to travel through difficult or unknown country. A party of three men is best, especially if the route is rough and relatively unknown, two men relieving each other in taking notes and observations, and driving, and the third digging sample holes. The latter man can be unskilled and, in unfamiliar sections, can be hired locally, in part for his knowledge of roads and general terrain. With the judicious use of a sturdy automobile, very little walking will be necessary. The automobile should be light and powerful, with light truck body and enclosed driver's compartment. The number of sample containers (one quart paint cans are convenient) and the completeness of the equipment will be governed by the type of country, weather conditions, and distance from operating base. Conditions vary so widely that it is very difficult, without dealing with specific instances, to say how long it would take to cover a certain distance. It might be said, however, that in average open country, where it is possible to drive the car along the route without making many or unreasonably long detours, a distance of 15 to 25 miles can usually be covered in a working day.

Compiling Report

The final report, to fulfill its previously stated usefulness, will tabulate soil analysis, moisture and texture, and other observations indicating the expected corrosiveness, and give recommendations for types of protection that may be used effectively; also distances for each type and approximate quantities involved. Reasons for selecting various types will not be discussed here, but have been outlined in the previously mentioned reference of Pipe Protection Committee Report, Pacific Coast Gas Association, 1931. Quantities, or coverages, may be obtained from the manufacturers, but should be developed by the dictates of experience and specific needs, bearing in mind that atmospheric temperatures will very greatly influence the viscosity of primers and paints and the thickness of bituminous enamels and viscous greases, and that in sections where work is difficult or where a great many field joints are made there will be considerable wastage and patching and overlapping which may greatly reduce coverage.

It is believed that such a report will constitute a valuable addition to the information

Sprague Semi-Chrome Leather

Resists Acids
and Boiling Water

Now Used in All

Sprague Meters and Regulators

May we send you samples and data?

The Sprague Meter Co.

BRIDGEPORT, CONN.

Los Angeles, Calif., San Francisco, Calif.

Newark, Ohio

Davenport, Iowa Houston, Texas

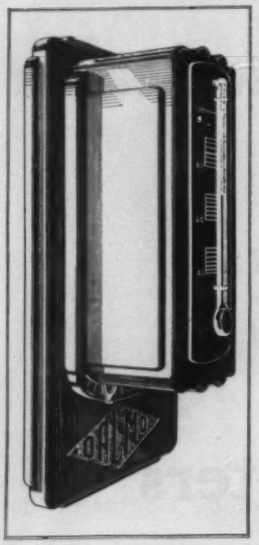
The Goodman Stopper

The Reliable Shut-off for Street Mains

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, N. Y.

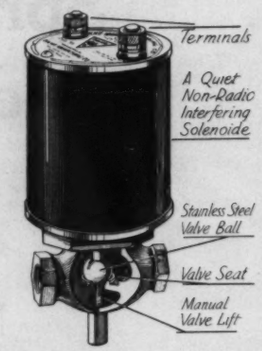
Pac. Coast Rep.: C. B. Babcock Co.
135 Bluxome Street
San Francisco, California



DALMO

Temperature Controls

Dalmo Portable Room Thermostat is an exclusive feature. It saves money by not wasting heat. Room registers may be shut off and thermostats moved from one flush plate to the other, thereby making it possible to control the furnace from any location desired. It is made in Bakelite in a neat and unobtrusive design, with thermometer in view, and has a positive off position.



Dalmo Gas Valve is guaranteed to be absolutely noiseless and positive in operation. Automatic shut-off on current failure. Simple to wire as there are only two wires.

Prices to fit 1932 pocketbooks

Dalmo Sales Corp.

511 Harrison St., San Francisco

customarily compiled by the engineering staff and by reason of anticipating application difficulties as much as by pre-determining corrosiveness, will amply justify its relatively negligible cost.

APPENDIX

"Pipe Line Currents and Soil Resistivity as Indicators of Local Corrosive Soil Areas," by E. R. Shepard, in Bureau of Standards Journal of Research, April, 1931.

"A Modern Soil Survey with Shepard Rods" by Arthur B. Allyne, in Gas Age-Record, August 22, 1931.

Pipe Protection Committee Report, Pacific Coast Gas Association, in August, 1931, issue of *Western Gas,* or Pacific Coast Gas Association Proceedings, Volume 22, 1931.

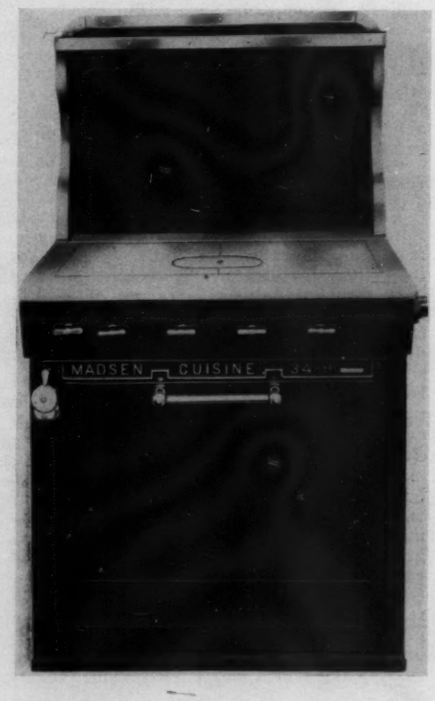
"Correlation of Certain Soil Characteristics with Pipe Line Corrosion" by I. A. Denison, U. S. Bureau of Standards Research Paper No. 363.

New Heavy Duty Ranges Placed on Market by Madsen

A NEW edition of the Cuisine series of heavy duty ranges, to be known as Cuisine Series 34, is announced by the Madsen Iron Works of Huntington Park, Calif. A stream-line body, with flush front and manifolds and pipes concealed; a concealed vent in the rear, and thermostat oven control are among the features stressed by the makers of the new Madsen Cuisine.

The range may be had with or without oven, with hot top, griddle plate, or open top. The griddle plate is heated by three double bar tubular gas burners with Rutz pilot lighter. Four star burners and Rutz lighter are provided for the open top.

The high shelf is heated from the range vent, which runs the entire length of the range at the extreme rear, and is hidden by the high shelf.



Model 34-H of the new series of Madsen heavy duty ranges.

One of 20 A.G.A. approved products — including floor furnaces, basement furnaces and console heaters

Manufactured by

Fraser Furnace Company

Stockton, Calif.

Distributed by

H. R. BASFORD CO. San Francisco Los Angeles

For smart living... this exclusive apartment hotel in the heart of the famous Wilshire District, overlooking beautiful Westlake and Lafayette Parks.

Rates on Application

L. C. Reed, Manager

The Arcady

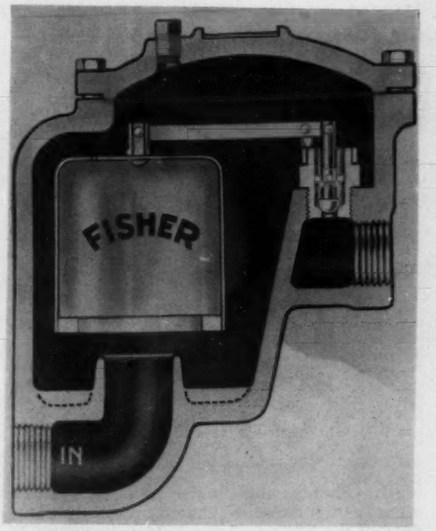
2619 WILSHIRE BLVD.

LOS ANGELES

Fisher Class ST Inverted Bucket Steam Trap Announced

THE Fisher Class ST Trap is announced by the Fisher Governor Co., Marshalltown, Iowa.

Features such as the adjustable valve post, and positively-guided inner valve, are a part of the Class ST Trap. Other construction features are—body and cover are of semi-steel, inverted bucket of heavy gauge spun brass, lever and pins of stainless steel. Valve and orifice seat are of the heat-treated stainless steel, resisting temperature, wire-drawing, and corrosion. The guided inner valve insures positive seating. Valve post has special adjustment for ease of setting when replacing parts. Pipe connections are horizontal with vertical offset.



The new Fisher Class ST trap.

All parts are accessible and renewable while trap is connected in pipe line and no special arrangements are required to remove any of the parts.

The Fisher Governor Co. has just published an attractive folder, known as the Bulletin ST-10, covering this class of equipment, giving capacity information in pounds of water handled for each size of trap on the various pressures, as well as all principal dimensions and price information.

Alco Valve Co. Announces New Representatives in West and Mid-West

The Alco Valve Co. of St. Louis, Mo., has recently made a change in its representation in the South. Adair C. Bovard, 610 North Glasgow Drive, Dallas, Texas, now covers Oklahoma, Texas, Louisiana, and southern Mississippi. Mr. Bovard also represents the Hill Manufacturing Co. and Henry Valve Co. of Chicago in the territory.

A new territory has been opened up in the Intermountain District. The Alco Valve Co. is now represented in Montana, Idaho, Wyoming, Utah, Colorado, and New Mexico by Urquhart Service, 2133 Blake Street, Denver, Colo. M. B. Urquhart is the head of this company.

Service for Nichols, Calif. in July

Coast Counties Gas and Electric Co., Santa Cruz, Calif., expects to begin serving gas in Nichols, Calif., about July 1.

If Pressure Drops + + +

C-F

Flow will S T O P *altogether*

A HEALTHY pressure or none, must be the aim in some uses of gas. It may be that a well needs to be protected from depletion, or that gas needs to be kept at higher pressure in one part of a line or system than in other parts. Set the *Fulton Back-Pressure or Check-Pressure Regulator* for any desired minimum, and gas will flow only while pressure on the inlet side remains above that minimum. When pressure drops, it will no longer hold the valve open against the weights imposed; and therefore flow ceases. Ask for circular showing sizes and prices.

C-F regulators have been known as the best for over forty years. Correspondence is invited concerning any requirement of gas control.

The Chaplin-Fulton Mfg. Company

Organized 1884—Oldest Builders of Gas Regulators in the Country. Built in all Sizes from 1 inch to 24 inches; For all Service, 1 oz. up to 2,000 lbs. Pressure to Square Inch.

28-40 Penn Avenue Pittsburgh, Pa.

REPRESENTATIVES

WESTCOTT & GREIS, Inc. JNO. W. CRAWFORD
Sales and Service Sales Engineer
Dallas — Tulsa 1855 Industrial Street Los Angeles

PARSONS ENGINEERING CO.
Los Angeles, Calif. San Francisco, Calif.
Or Any Jobber

FULTON
Back-Pressure
REGULATORS

GROBLE REGULATORS & GOVERNORS

Complete Line of Regulators for

Natural, Manufactured, Butane and Propane Gas

Pacific Coast Representative,

T. G. ARROWSMITH COMPANY,

661 Howard Street San Francisco, Calif.

Phone Garfield 8419

GROBLE GAS REGULATOR COMPANY

Office and Factory: Anderson, Indiana

The
JOHNSON-MARCH CORPORATION

Offices:

G. R. MARCH
CHATHAM PHENIX
BANK BLDG.
Long Island City, N. Y.

CARLL W. HUNT
7012 Stanford Ave.
Los Angeles, Calif.
(Office and Factory)

J. R. BULGER
230 No. Canal St.,
Chicago, Ill.

H. B. MAYES
2523 Wiltshire Blvd.,
Houston, Tex.

D. W. EDWARDS
401 Russ Bldg.,
San Francisco, Calif.

A. E. STREETER
18 E. Garfield St.,
Phoenix, Ariz.

Manufacturers and distributors of "McEverlast" Priming Coat, Cold Coatings, Hot Compounds, and Osnaburg Wrap for Complete Pipe Protection under any soil conditions.

[Johnson-March pipe coating and wrapping machines are offered our customers at very nominal rentals.]

Write now for specifications and literature which will be cheerfully furnished without obligation.

Our engineers will assist you in solving your pipe corrosion problems.

"McEverlast"--A Complete Pipe Protection Service

BITGOOD

Multiple Jet Gas Burners
Industrial Furnaces

SAN JOAQUIN BURNERS

Prat Daniel Thermix Stacks and Air Heaters
Bigelow-Liptak Suspended Arches and Walls
North American Burners and Blowers

F. S. BITGOOD, Inc.

Furnace and Combustion Engineers

Los Angeles Portland San Francisco

The Semet-Solvay Engineering Corporation
invites your inquiries for

Equipment for the manufacture, cleaning and handling of gas.
Equipment for the recovery and treatment of coal by-products.
Welded steel products, piping and valves.
Producer gas and blue gas apparatus.
Engineering service, investigations and reports.

Semet-Solvay Engineering Corporation

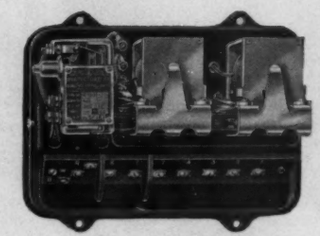
40 Rector St. New York, N. Y.

Protectoglow Announced by Minneapolis Honeywell Regulator Co.

THE Protectoglow, a development in the automatic control field, a device which provides protection against the escape of unburned gas or oil in the event of flame or pilot failure, has been announced by the Minneapolis-Honeywell Regulator Co, Minneapolis, Minn.

The Protectoglow tube, which acts as an electrical relay, operates at the command of an electric current passed through the flame

The Protectoglow



The Glo-Relay

itself. Should the flame fail, the circuit through the flame is broken, instantly shutting off the gas or oil flow. In the absence of pilot flame, the Protectoglow will not allow the burner to start.

The Glo-Relay is used in conjunction with the Protectoglow and serves to operate the valves or motor of the burner at the command of the thermostat, control switch, or Protectoglow. It is self-contained and is available for either constant or intermittent ignition burners.

Natural Gas Pipeline Co. of America Plans 80-Mile Iowa Project

The natural gas transmission line announced last month by Natural Gas Pipeline Co. of America, Chicago, to serve Marshaltown and Grinnell, Iowa, will be extended to Waterloo, 80 miles north of the main Texas-Chicago line of the company. The new lateral will leave the 24-inch carrier at a point just west of Oskaloosa, with laterals to Grinnell and Marshalltown, and possibly other towns along the route. Surveys are now being run by engineers of the company and rights-of-way being secured.

Amarillo Gas Co. Spending $35,000 on Improvements

A $35,000 construction program to improve service to consumers and to care for future growth of Amarillo, Texas, has been completed by the Amarillo Gas Co. The work was begun during the latter part of October.

More than 6 miles of welded pipe, varying from 3- to 8-inch in size, for both low and intermediate pressure service, a major border station providing the western part of the city a direct feed to the gas fields, and an intermediate pressure loop around the southwestern part of the city were some of the improvements. In addition, 12 sites were purchased for new regulator stations and eight stations have been erected.

J. A. Campbell Engineering Corp. Organization Announced

Effective March 15, 1932, the absorption plant engineering construction and equipment business formerly carried on by the J. A. Campbell Co., Long Beach, Calif., was sold to a new organization, known as the J. A. Campbell Engineering Corp., with offices at 973 North Main St., Los Angeles. The new organization is under the management of Henry N. Wade and C. L. Parkhill, both of whom have been connected with the J. A. Campbell Co. for a number of years. All absorption plant equipment developed by Mr. Campbell is available through the new corporation.

Mr. Campbell is continuing in business at Long Beach under his own name, manufacturing several specialty items for the gas and oil industries.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC.,

Required by the Act of Congress of August 24, 1912, of *Western Gas*, published monthly at Los Angeles, California, for April 1, 1932.

State of California,
County of Los Angeles—ss.

Before me, a notary public in and for the State and county aforesaid, personally appeared Jay Jenkins, who, having been duly sworn according to law, deposes and says that he is the publisher of *Western Gas*, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:
Publisher—Jay Jenkins, Los Angeles, California.
Managing Editor—George H. Finley, Los Angeles, California.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)
Western Business Papers, Inc., Los Angeles.
James E. Jenkins, Los Angeles, Calif.
Jay E. Jenkins, Los Angeles, Calif.
George H. Finley, Los Angeles, Calif.
H. Elliott Taylor, San Francisco, Calif.
Craig Espy, New York City.

3. That the known bondholders, moragagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)
None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation, for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

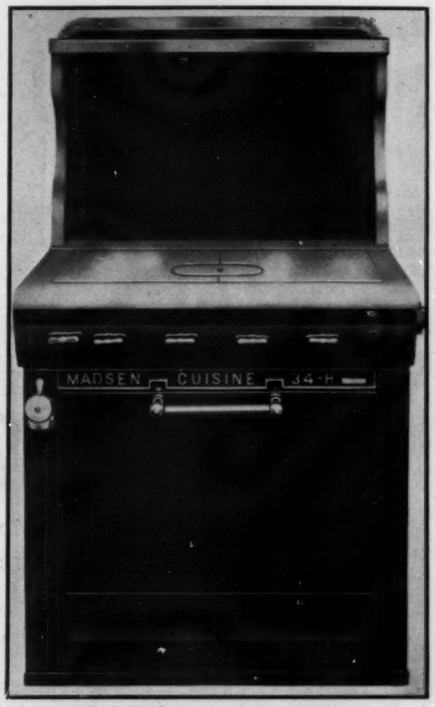
5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is ..... (This information is required from daily publications only.)

JAY JENKINS.
Publisher.

Sworn to and subscribed before me this 1st day of April, 1932.

(Seal) JOSEPHINE C. WHITING,
Notary Public.

(My commission expires March 25, 1936.)



New!

MADSEN

Presents . . . .
AMERICA'S
FINEST
HEAVY-DUTY
RANGE

•

MADSEN CUISINE
SERIES 34

•

THE MADSEN IRON WORKS takes pride in presenting a modern, gas-fired heavy duty range thoroughly in step with today's standards and requirements.

A trim, stream-line body as smart as the 1932 motor car . . . an engineering design that establishes a new high peak for fuel economy . . . speed, flexibility, and ease of control which bring new efficiency to modern cookery . . . extreme strength without excess weight—in short, a modern range that will out-perform the range of yesterday just as today's motor car out-performs the car of a year ago.

Many important new features: *Thermostat-Controlled Oven*, insulated front, back, sides and bottom with one inch of rock wool. *Flush-Front Body*, finished in baked, black enamel, nickel-trimmed, and with all manifolds and pipes concealed. *Concealed Vent*, back of hot shelf, for which it furnishes heat. *Highly-Polished*, *Special-Alloy*, *Top Plates*. *Madsen Siphon Burners*. A model for every modern kitchen need—Hot Top, Fry Top, Open Top, with or without ovens.

Write for detailed specifications. The prices will prove an agreeable surprise.

MADSEN IRON WORKS, Ltd.

P. O. Box 601, Huntington Park, Calif. (Suburb of Los Angeles)
San Francisco Factory Representative: Fred R. Sanford, 837 Howard St.
Madsen Hotel and Restaurant Kitchen Equipment Sold by Leading Equipment Dealers.

FORNEY

COMBINATION GAS and OIL BURNERS

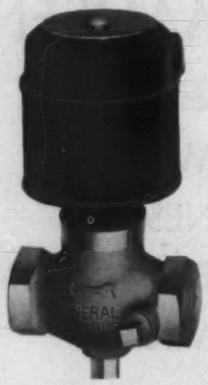
For Power Plant and Industrial Uses

Write for Literature and List of Installations

FORNEY COMBUSTION ENGINEERING CO.

513 CENTRAL BANK BUILDING, DALLAS, TEXAS

5 agencies are now open in the Mid-Continent for the General Controls Magnetic Gas Valve.

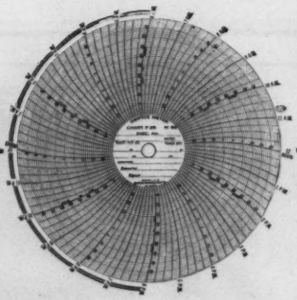


A Straight A. C. Valve
Absolutely Noiseless
Low in Price

+

GENERAL CONTROLS CO., Ltd.
1539 Folson St., San Francisco

Jensen Instrument Company
Los Angeles Distributors



Why

are thousands of ARCCO Orifice Meter Charts being used daily ?

... It will pay you to investigate before placing your next order.

See G. H. Unkefer at Tulsa Convention

American Recording Chart Company
MUtual 9183
428 Boyd Street
LOS ANGELES

The PARK WILSHIRE
HOTEL APARTMENTS

Most desirably situated on Wilshire Boulevard, adjoining beautiful Westlake Park---15 minutes from the city center. By bus directly in front of the building and by three car lines within one block.

•

Apartments from $75 a Month
Also Daily and Weekly Rates

•

2424 Wilshire Blvd., at Westlake Park

•

Modern, Home-like and Supremely Comfortable

LOS ANGELES

Classified Advertising

Classified advertising five cents per word; minimum $2.00 per insertion. Situation Wanted advertisements up to 50 words will be published three consecutive issues without charge. Small professional cards 1-in. deep by 21 ems wide are $5.00 monthly on 12-time contract.

EMPLOYMENT OFFERED

WANTED: Manufacturer's Agent for high grade line of gas regulators. Must be familiar with regulators and regulation and be well known to trade. If interested, indicate territory covered. Address Box B-108, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

SITUATIONS WANTED—MALE

Young man, 25 years of age, with more than three years experience in house heating with natural gas, desires position. Applicant has had college education, and is familiar with installation and adjustment of all types of conversion burners, gas fired boilers and furnaces. Is capable of estimating heating requirements and can handle design of installations. Some experience with industrial boiler conversion of 100 h.p. and less. Address Box E-189, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

General manager of natural gas distributing company, having exceptional experience in building industrial load in new territory, desires to make change. Graduate engineer and previous knowledge of manufactured gas operations and several years of selling gas plant equipment. Address Box E-191, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Engineering graduate, experienced in design, testing and construction of butane gas plants and general engineering practice, desires position. Address Box E-193, *Western Gas,* 124 West Fourth St., Los Angeles, Calif.

Gas measurement engineer and accountant seeks position. Broad experience in both office and field with orifice meters, computation of charts, and accounting records for gas and natural gasoline. Familiar with charcoal testing, gasoline distillation, and other laboratory work connected with absorption plants and gas measurement. Age 31. Will go anywhere. Address Box E-195, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Service man, aged 35, with five years experience in manufactured, natural and butane gases, desires position. Applicant is experienced in welding and in installing mains and services. Will go anywhere. Address Box E-197 *Western Gas,* 124 West Fourth Street, Los Angeles, Calif. *(Turn to Page 98)*

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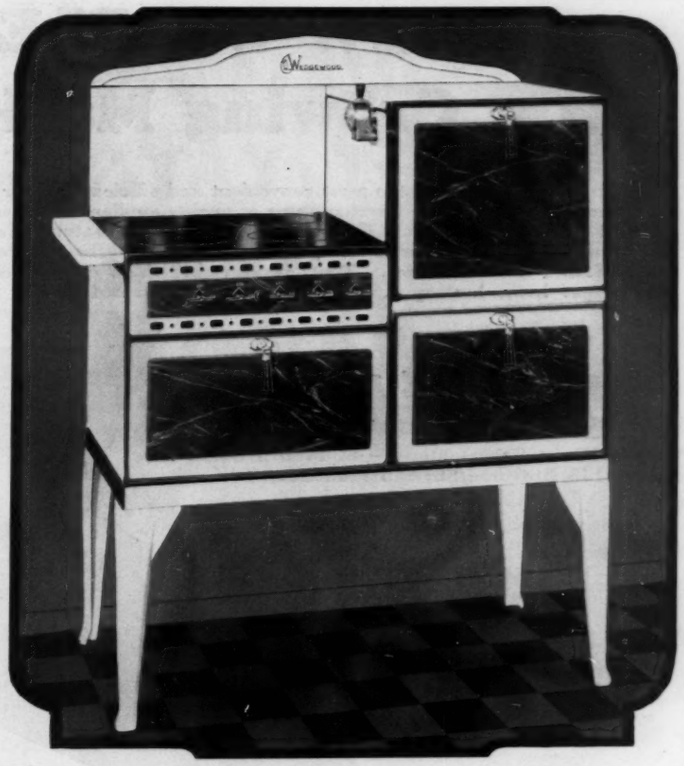

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Pacific Coast Representative—C. B. BABCOCK CO.
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Expert meter repairman, shop supervisor with meter maintenance experience desires position. Has had eight years experience repairing and testing ironcase dry gas meters. Has also had experience in regulator repair and meter installation. Applicant prefers to locate in east or south but will consider any location. Good references. Address Box E-199, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

University Graduate, age 37, with 15 years utility experience in gas distribution and transmission, steam, diesel and hydro power plant design, detail and supervision, desires position. Applicant has had responsible engineering charge developing diversified utilities. Can offer excellent references as to ability and character. Address Box E-201, *Western Gas,* 124 West Fourth Street, Los Angeles, California.

Auditor and accountant, thoroughly experienced in all phases of public utility and other accounting operations. gas and oil included, desires position. Will locate anywhere. Very moderate salary. Available immediately. Unquestionable references furnished from large national concerns. Address Box E-203, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Executive seeks position as manager of gas property. Experience covers 20 years of both manufactured and natural gas. Can build industrial and house heating load and can handle merchandising and public relations work. Excellent references. Available immediately. Salary desired $3,000. Address Box E-205, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

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Thomas of Cooper Bessemer Dies; Hudgins Appointed

Fred H. Thomas, vice-president and general sales manager of The Cooper-Bessemer Corp., Mt. Vernon, Ohio, died of heart failure on Sunday, March 27, at his home. His death followed a four months' illness.

Mr. Thomas became affiliated with the former C. & G. Cooper Co. in 1907, after two years with The Babcock Wilcox Co. and The Unites States Steel Co. For the past 15 years he has been vice-president and general sales manager of the merged company which resulted from consolidation of The C. & G. Cooper Co. and The Bessemer Gas Engine Co., builders of gas and oil engines and compressors.

T. F. Hudgins, vice-president and western sales manager has been appointed to succeed Mr. Thomas as general sales manager.

Coming with the former C. & G. Cooper Co. in 1923, Mr. Hudgins has been in charge of all sales west of the Mississippi River.

Mr. Hudgins will make his home in Mt. Vernon, Ohio, where the general offices of The Cooper-Bessemer Corp. are located.

Walker of Republic Steel Corp. On Pacific Coast in April

A. E. Walker, assistant vice-president of Republic Steel Corp., Youngstown, Ohio, was on the Pacific Coast for two weeks during April in the interest of pipe deliveries for the natural gas line to San Diego. The pipe contract on this line was awarded recently to Republic through Ducommon Corp. of Los Angeles.

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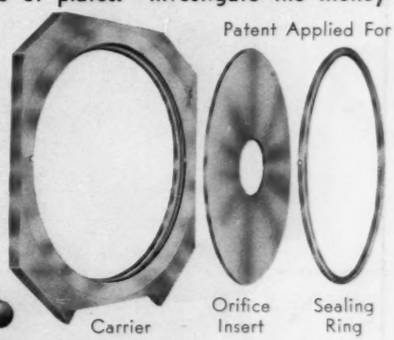

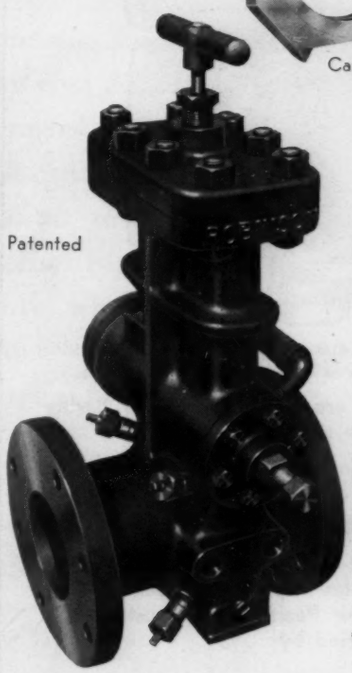

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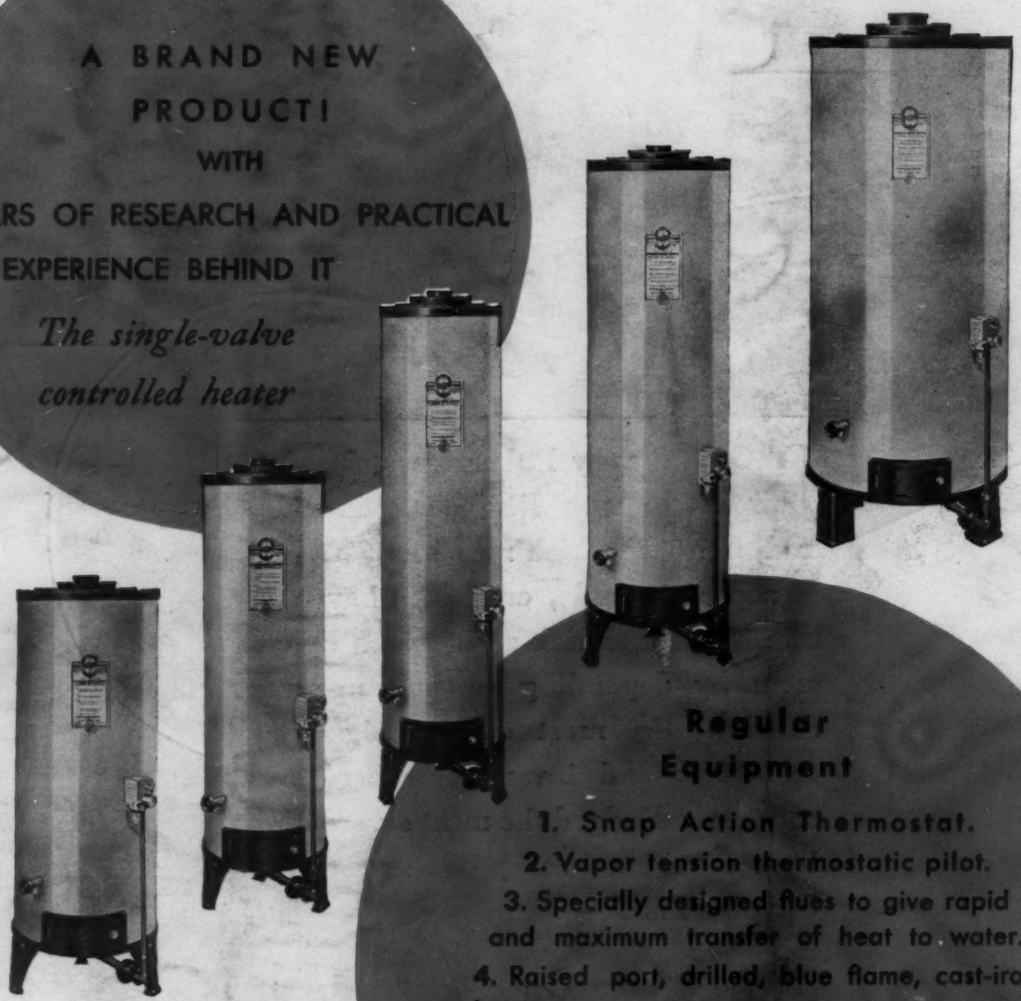

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